



CATALOG | 1908

# 2008 Publications Catalog





## **Publications Catalog 2008**

This catalog lists publications published by The WorldFish Center and papers contributed by the Center's scientists in 2008. It reflects the outcomes of research carried out in collaboration with partners from 27 countries through the generous support from international investors. The majority of which are members of the CGIAR.

The catalog is divided into 4 sections:

- Corporate publications
- Refereed publications
- Non-refereed publications
- Videos and CDs

They are sorted alphabetically by the surname of the primary author and abstracts are provided. The index of WorldFish authors at the end of this catalog will lead you to specific pages for easy referencing.

The number of contributions at the time of publishing this catalog is:

	2008
• Corporate publications	4
• Refereed publications	43
• Non-refereed publications	54
• Videos and CDs	5



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## **CORPORATE PUBLICATIONS**

**Annual report 2007/08.** 4 p. The WorldFish Center, Penang.

This brochure captures the essence of the work and projects with key partners by WorldFish in 2007/08. A balance sheet is also provided for reference.

**Medium term plan 2009-2011. WorldFish Center Corporate publication1863,** 92 p. The WorldFish Center, Penang.

This Medium-Term Plan (MTP) sets out the WorldFish Center response for harnessing fisheries and aquaculture to help address the global issue of food shortage and poverty by addressing two key development challenges: i) expanding sustainable aquaculture, and ii) ensuring productive and resilient small-scale fisheries. The MTP is developed around six major areas: 1. Global drivers of change 2. Markets and trade 3. Multi-level and multi sectoral governance 4. Improving sustainable aquaculture technologies 5. Aquaculture and the environment 6. Resilience in practice for small-scale fisheries.

The WorldFish Center. 2008.

**2007 Publications catalog.** 51 p. The WorldFish Center, Penang.

This catalog lists publications published by the WorldFish Center and papers contributed by the Center's scientists in 2007. It reflects the outcomes of research carried out in collaboration with partners from different countries through the generous support from international investors.

The WorldFish Center. 2008.

**Who we are what we do.** 8 p. The WorldFish Center, Penang.

This brochure describes how WorldFish is contributing towards these goals and the valuable role played by fisheries and aquaculture in developing countries.

## REFEREED PUBLICATIONS

Ahmed, N. ; Allison, E.H. ; Muir, J.F. 2008.

**Using the sustainable livelihoods framework to identify constraints and opportunities to the development of freshwater prawn farming in southwest Bangladesh.** Journal of the World Aquaculture Society 39(5):598-611.

A conceptual framework, drawn from an approach to poverty reduction known as the Sustainable Livelihoods Approach (SLA), is applied to understanding the role of freshwater prawn, *Macrobrachium rosenbergii*, farming in gher (modified rice fields with high, broad peripheral dikes) systems in southwest Bangladesh. Gher farming potentially allows incorporation of a wide variety of crops together with prawn, fish, dike crops and rice culture. The analysis shows how, in a gher farming context, sustainable livelihoods are achieved through access to a range of livelihood assets which are combined in the pursuit of prawn farming strategies. The study used the SLA framework as a diagnostic tool to identify ways of strengthening the livelihoods of the prawn farmers.

Alam, M.F. ; Murshed-E-Jahan, K. 2008.

**Resource allocation efficiency of the prawn-carp farmers of Bangladesh.** Aquaculture Economics and Management 12:188-206.

This paper evaluates resource allocation efficiency of prawn-carp polyculture systems by making use of the data of 105 farmers of Bangladesh. Data Envelopment Analysis (DEA) was employed to estimate the efficiency. Mean technical efficiency (TE), allocative efficiency (AE) and cost efficiency (CE) were 85%, 58%, and 49%, respectively. Fifty percent of prawn-carp farmers displayed full TE whereas only 9% were cost efficient. Actual input application largely deviated from the technical and cost-efficient levels. TEs and AEs showed a positive and negative correlation with pond size, respectively. Labor, fingerlings and feed were overused while organic and inorganic fertilizers were underused in general. Adjustments in actual input allocations were necessary to make use consistent with TE and CE levels. The study concludes that mere achievement of technical efficiency in prawn-carp production may be a short-run concern; the farmers have to be economically efficient in the long-run.

Armitage, D.R. ; Plummer, R. ; Berkes, F. ; Arthur, R.I. ; Charles, A.T. ; Davidson-Hunt, I.J. ; Diduck, A.P. ; Doubleday, N.C. ; Johnson, D.S. ; Marschke, M. ; McConney, P. ; Pinkerton, E.W. ; Wollenberg, E.K. 2008.

**Adaptive co-management for social-ecological complexity.** *Frontiers in Ecology and the Environment* 6(online first).

Building trust through collaboration, institutional development, and social learning enhances efforts to foster ecosystem management and resolve multi-scale society–environment dilemmas. One emerging approach aimed at addressing these dilemmas, is adaptive co-management. This method draws explicit attention to the learning (experiential and experimental) and collaboration (vertical and horizontal) functions necessary to improve our understanding of, and ability to respond to, complex social–ecological systems. Here, we identify and outline the core features of adaptive co-management, which include innovative institutional arrangements and incentives across spatiotemporal scales and levels, learning through complexity and change, monitoring and assessment of interventions, the role of power, and opportunities to link science with policy.

Baran, E. ; Myschowoda, C. 2008.

**Have fish catches been declining in the Mekong River Basin?** p. 55-64. In: Kumm, M.; Keskinen, M. ; Varis, O. (eds.). *Modern myths of the Mekong.* Finland : Helsinki University of Technology.

This book chapter sets out to test the hypothesis that fisheries production has declined in the Mekong Basin. Despite the lack of clear evidence of a decline in the overall production of the Mekong fish catches in the past, there are such threats as industrial development, upstream damming, disruptive fishing methods and use of highly hazardous chemicals imported from neighbouring countries which may cause the actual decline in fish catch in the future.

Bartley, D.M. ; Bell, J.D. 2008.

**Restocking, stock enhancement, and sea ranching: arenas of progress.** *Reviews in Fisheries Science* 16(1-3):357-365.

There are concerns about the sustainability of the world's capture fisheries at the current total level of ~96 million tons per year. The warning signals are an increase in the proportion of depleted or recovering stocks, from about 10% in 1974 to 28% in 2004, and a corresponding decrease of under- to moderately exploited stocks from about 40% to 24%. It is widely acknowledged that reductions in fishing effort and restoration of fish habitats are needed to improve resilience of capture fisheries.

Nevertheless, for some coastal fisheries, application of aquaculture technology through restocking, stock enhancement, and sea ranching also promises to help restore lost production and possibly increase harvests beyond historical levels. However, application of this technology still has a long way to go before integrated management systems are in place that successfully address all the biological, ecological, social, cultural, and economic issues. The main challenges include identifying when and where to use the interventions to add value to other forms of management; integrating these initiatives with institutional and fisheries management regimes; monitoring success of the interventions; producing cultured juveniles cost-effectively; and releasing them in the wild so that they survive in high proportions. We summarize progress to date by describing the main lessons learned from 30 years of research into the potential for releasing cultured juveniles into coastal fisheries, and from application of this technology at various scales. We also describe other lessons to be learned from stocking freshwater habitats and other emerging issues for enhanced coastal fisheries, such as market opportunities and the need to develop widely accepted definitions for “restocking,” “stock enhancement,” and “sea ranching.” These definitions are needed so that nations can report and monitor different strategies used to improve productivity of capture fisheries.

Bell, J.D. ; Leber, K.M. ; Blankenship, H.L. ; Loneragan, N.R. ; Masuda, R. 2008.

**A new era for restocking, stock enhancement and sea ranching of coastal fisheries resources.** Reviews in Fisheries Science 16(1-3):1-9.

The growing number of countries investigating the potential for releasing cultured juveniles to augment coastal fisheries resulted in the First International Symposium on Stock Enhancement and Sea Ranching (ISSESR) in Norway in 1997. The 1st and 2nd ISSESR, in Japan in 2002, were instrumental in developing methods for mass production of environmentally fit juveniles and for releasing them in responsible ways. The 3rd ISSESR, held in the U.S.A. in 2006 ([www.SeaRanching.org](http://www.SeaRanching.org)), ushered the discipline into a new era. The major advances included: (1) definitions of the various objectives for releasing cultured juveniles (restocking, stock enhancement, and sea ranching); (2) a framework for integrating releases within their fisheries management context, including tools for quantitative assessment; (3) a systematic, transparent, and stakeholder participatory planning process to determine whether releases have a cost-effective role to play in managing a fishery; (4) a comprehensive case study (blue crabs in Chesapeake Bay) describing the multi-disciplinary approach needed to evaluate the potential benefits of releases; and (5) a suite of other lessons to guide stakeholders in evaluating the potential for and implementation of releases.

Bell, J.D. ; Purcell, S.W. ; Nash, W.J. 2008.

**Restoring small-scale fisheries for tropical sea cucumbers.** *Ocean and Coastal Management* 51(8/9):589-593.

Overfishing threatens to extinguish local fisheries for valuable tropical sea cucumbers by reducing population densities to the point where reproductive success trails behind natural mortality (known as depensation or the 'Allee effect'). Once this happens, conventional management measures alone, such as closed seasons/ areas, size limits and gear restrictions, will usually fail to repair the damage. A different suite of active management interventions must be considered to restore the spawning biomass of severely over-exploited populations. These include: (1) restocking no-take zones with hatchery-reared juveniles; (2) aggregating remnant wild individuals in no-take zones; and (3) development of small enterprises to rear wild-caught sea cucumbers in simple sea pens, or dedicated sublittoral areas, to the size above sexual maturity that optimises earnings. The first intervention is currently limited to a few species of tropical sea cucumbers, whereas the second and third interventions can be applied to many species. The third intervention is particularly attractive – it allows fishers to add value to their catch, reverses the effects of fishing from damaging to improving the potential for replenishment by overcoming the Allee effect, and creates multiple groups of spawners to supply recruits throughout the range of the population(s) supporting a fishery.

Bell, S.S. ; Tewfik, A. ; Hall, M.O. ; Fonseca, M.S. 2008.

**Evaluation of seagrass planting and monitoring techniques: implications for assessing restoration success and habitat equivalency.** *Restoration Ecology* 16(3):407-416.

Restoration has become an integral part of coastal management as a result of seagrass habitat loss. We studied restoration of the seagrass (*Halodule wrightii*) near Tampa Bay, Florida. Experimental plots were established in June 2002 using four planting methods: three manually planted and one mechanically transplanted by boat. Seagrass cover was recorded at high resolution (meter scale) annually through July 2005. Natural seagrass beds were concurrently examined as reference sites. We also evaluated the suitability of a commonly used protocol (Braun-Blanquet scores, BB) for comparing the development of seagrass cover using the planting methods and quantifying spatial patterns of cover over time. Results show that BB scores mirrored conventional measures of seagrass characteristics (i.e., shoot counts and above- and belowground biomass) well when BB scores were either low or very high. However, more caution may be required at intermediate cover scores as judged by comparison of BB scores with direct measurement of seagrass



abundance. Significant differences in seagrass cover were detected among planting methods and over time (2002–2005), with manual planting of rubber band units resulting in the highest cover. In contrast, the peat pot and mechanical planting methods developed very low cover. Recovery rates calculated from development of seagrass spatial cover were less than those reported for natural expansion. Importantly, time to baseline recovery may be substantially greater than 3 years and beyond standard monitoring timelines. Prolonged recovery suggests that the rate of service returns, critical for estimating compensatory restoration goals under habitat equivalency analysis, may be severely underestimated.

Béné, C. ; Bandi, B. ; Durville, F. 2008.

**Liberalization reform, “Neo-centralism”, and black market: the political diseconomy of Lake Nasser fishery development.** *Water Alternatives* 1(2):219-235.

Despite its relatively modest importance, and the current difficulties faced by the government in implementing liberalization in the rest of the country, the Egyptian government decided to embark on a reform of the Lake Nasser fishery in the early 2000s. The objective of this article is to analyse the evolution of this reform from a political economy perspective. The paper looks retrospectively at the general context of the reform, describes the different institutional and economic changes that have resulted from its realization, identifies how the distribution of power between the different actors has altered the course of its implementation, and finally assesses the outcomes of the reform. The analysis shows that, while some major institutional changes have taken place, those changes have had little to do with a ‘liberalization’ as conventionally understood in neo-classical literature. Instead, the new status quo turns out to be one where the central government and its different parastatal agencies have managed to maintain their existing advantages. The failure to reform more thoroughly the system also led fishers and fish traders to engage in a large scale black market activity in which a substantial amount of fish is smuggled through unofficial trade channels.

Béné, C. ; Doyen, L. 2008.

**Contribution values of biodiversity to ecosystem performances: a viability perspective.** *Ecological Economics* 68:14-23.

This paper deals with the contribution value of biodiversity to ecosystem performances under a viability approach. Two contrasted cases are considered. First, a no-exploitation situation where the ecosystem performances are measured through the capacity of species richness to maintain the ecosystem above a

minimum ecological viability threshold measured through a Shannon index. Second, an exploitation situation where the performances of the ecosystem are measured through its economic sustainability, that is, its capacity to generate direct-use values greater than a minimum guaranteed utility level. The analysis, based on numerical simulations, shows that biodiversity has a positive effect on both ecological and economic performances and that in both cases the marginal contribution of biodiversity is positive. Furthermore, this marginal contribution exhibits maximum values. These maximum values seem however to decrease with the level of species richness. These results show interesting links with two of the main current debates on biodiversity: the Noah's Ark problem and the assumption of decreasing marginal value supported by some recent works on bio-prospecting.

Béné, C. ; Merten, S. 2008.

**Women and fish-for-sex: transactional sex, HIV/AIDS and gender in African fisheries.** World Development 36(5):875-899.

This paper analyzes the phenomenon of fish-for-sex in small-scale fisheries and discusses its apparent links to HIV/AIDS and transactional sex practices. The research reveals that fish-for-sex is not an anecdotal phenomenon but a practice increasingly reported in many different developing countries, with the largest number of cases observed in Sub-Saharan African inland fisheries. An overview of the main narratives that attempt to explain the occurrence of FFS practices is presented, along with other discourses and preconceptions, and their limits discussed. The analysis outlines the many different and complex dimensions of fish-for-sex transactions. The paper concludes with a set of recommendations.

Béné, C. ; Steel, E. ; Luadia, B.K. ; Gordon, A. 2008.

**Fish as the "bank in the water" - evidence from chronic-poor communities in Congo.** Food Policy 34(1):108-118.

Small-scale fisheries in developing countries are often perceived as being a low-productivity and backward informal sector. As a result they are rarely considered in poverty reduction programmes and rural development planning. In this paper, we investigate the dual role of fish as a food and cash crop through data collected in river fisheries in Democratic Republic of Congo (DRC). Fishing in this very remote rural region of DRC is operated both by men and women, as part of a household multiple activity livelihood strategy. The data shows that poor households rely heavily on fishing for their supply of protein-rich food, in particular through women's subsistence catches. Fishing also appears to be the main source of cash income for the majority of households, including local farmers. Based on these findings

and a review of the literature, the paper argues that small-scale fisheries can play a fundamental role in local economies, especially in remote rural areas where they strengthen significantly the livelihoods of people through their role in both food security and cash-income generation.

Bhujel, R.C. ; Shrestha, M.K. ; Pant, J. ; Buranrom, S. 2008.

**Ethnic women in aquaculture in Nepal.** *Development* 51(2):259-264.

The Women in Aquaculture project was launched in two districts of central Terai in Nepal jointly by AIT (Thailand) and Institute of Agriculture and Animal Science (Nepal). The project has trained five groups of about 150 women belonging to a traditional ethnic fishing community and supported by fish farming as a means of additional income generation and source of protein supply for the family.

Briones, R.M. ; Dey, M.M. ; Mahfuzuddin Ahmed, A.K.M. ; Prein, M. ; Stobutzki, I. 2008.

**Priority setting for research on aquatic resources: an application of modified economic surplus analysis to natural resource systems.** *Agricultural Economics* 39:1-13.

In contrast to research on farming systems, research on natural resource systems seldom applies rigorous priority setting techniques, mainly due to difficulties associated with estimating research impact ex ante for such systems. This article presents a replicable approach to priority setting that addresses these difficulties. Assessment is based on multiple criteria, combining economic surplus analysis with subjective scoring, based on information drawn from a cross-country survey of expert opinion. The approach is applied to the WorldFish Center, a global agricultural research organization focusing on living aquatic resources, both farmed and wild. The exercise demonstrates the relevance of conventional evaluation techniques to fisheries research based on a practical application of its impact pathways.

Brooks, S.E ; Reynolds, J.D. ; Allison, E.H. 2008

**Sustained by snakes? Seasonal livelihood strategies and resource conservation by Tonle Sap fishers in Cambodia.** *Human Ecology* 36:835-851

This paper situates concerns for conservation of aquatic snakes and livelihood sustainability in Cambodia within a social-ecological systems context and thereby presents a challenge to conventional species-based conservation programmes. Fishing for low-value water snakes has become a widespread activity within the

floating communities of Tonle Sap Lake in the last 20 years in response to new market opportunities, provided primarily by a crocodile farming industry. The scale and intensity of this new form of exploitation and reports of declines in catch per fisher have highlighted this activity as a conservation concern, yet its role within local livelihood strategies was previously unknown. We show that it is of increasing importance to the less well-off, and is linked to higher incomes within this group, where it potentially reduces their vulnerability to fluctuations and declines in fish catches. It is particularly important as a means to smooth seasonality of incomes in this flood pulse-driven social–ecological system. We argue that shifts between snake-hunting and fishing, as a market-driven adaptive livelihood strategy by the poor, may be more compatible with wider ecosystem conservation and development goals than alternatives such as increased fishing effort or converting floodplain habitats for seasonal agriculture.

Brummett, R.E. 2008.

**Genetic quality of cultured tilapia stocks in Africa.** *World Aquaculture* 39(2):46-49.

African aquaculture is poised for rapid expansion. However, one of the key constraints holding back growth of the sector is the poor quality of the fish stocks available for culture. The problems of declines in growth performance associated with the loss of genetic diversity and ways to improve fish stock via genetic improvement strategies are discussed.

Brummett, R.E. ; Lazard, J. ; Moehl, J. 2008.

**African aquaculture: realizing the potential.** *Food Policy* 33:371-385.

Despite 40 years of research and development, and hundreds of millions of dollars spent, aquaculture is struggling to realize its high biophysical potential in Africa. Hampered by ineffective institutional arrangements and donor-driven projects, the substantial gains in desperately needed food security and economic growth predicted by development agencies have generally not been achieved. Nevertheless, African aquaculture has demonstrated its competitiveness, producing fishes that feed low on the food chain in a range of well-adapted, environmentally friendly and profitable farming systems that meet the needs of a broad spectrum of user-groups. Key constraints to broader growth include lack of good quality seed, feed and technical advice; poor market infrastructure and access; and weak policies that, rather than accelerate, impede expansion, largely by emphasizing central planning over private sector initiative. If African aquaculture is to make substantial and much needed contributions to the continent's development, government policy

should attempt to facilitate the alleviation of key constraints and rely more heavily on commercial investments to lead future growth. Evidence to date indicates that a pragmatic business approach focusing on small and medium-scale private enterprises would produce more benefits for more people than centrally planned and government led development projects.

Charo-Karisa, H. ; Komen, H. ; Bovenhuis, H. ; Rezk, M.A. ; Ponzoni, R.W. 2008  
**Production of genetically improved organic Nile tilapia.** Dynamic Biochemistry, Process Biotechnology and Molecular Biology 2(S1):50-54.

Demand for organic products for human consumption has been on the increase due to the belief that organic products are safer and healthier to the consumer and the environment. In developing countries, Nile tilapia (*Oreochromis niloticus*) is usually grown in low-input organically fed ponds with little or no high protein supplementary feeding, an environment suitable for production of organic fish. However, Nile tilapia from such production systems do not attain large sizes which leads to low pond yields. This paper presents results of an attempt to improve the performance of organically farmed tilapia through selection for growth in organically fertilised earthen ponds. The selection environment consisted of earthen ponds fertilized daily with 50 kg dry matter (dm)/ha chicken manure. Body weight increased with selection and substantial response was recorded. Gut length increased with selection for body weight. Moreover, gut length and body weight were genetically highly correlated indicating that tilapia selected for growth on a herbivorous diet may develop longer guts as a mechanism for increasing capacity and efficiency for nutrient absorption. Taken together, these results demonstrate the feasibility of selection for growth of organic Nile tilapia. Meanwhile, organic certifications for Nile tilapia should be instituted for better prices and increased profits of organic fish.

Choo, P.S. 2008.

**Resources on gender and fisheries.** Development 51(2):292-294.

This is a list of the latest studies, collections, papers, articles and theses on gender and fisheries

Choo, P.S. ; Barbara, S. ; Nowak, K. ; Kusakabe, K. ; Williams, M.J. (eds.). 2008.

**Gender and Fisheries.** Development 51(2).

This special issue with contributions from three worldfish scientists focuses on the gender dimensions of fisheries which provide rich ground for perspectives on development policy and community based strategies for livelihoods, gender and social justice.

Chowdhury, M.A.K. ; Goda, A.M.A.S. ; El-Haroun, E.R. ; Wafa, M.A. ; Salah El-Din, S.A.

**Effect of dietary protein and feeding time on growth performance and feed utilization of post larval freshwater prawn *Macrobrachium rosenbergii* (de Man 1879).** Journal of Fisheries and Aquatic Science 3(1):1-11.

A growth trial was conducted to investigate the effect of different dietary protein and feeding times on growth performance and feed utilization of freshwater prawn *Macrobrachium rosenbergii* Post-Larvae (PL). The experiment was conducted in outdoor concrete pens (6 m<sup>3</sup>) for 84 days. Post-larvae with an average weight of 20.8±0.17 mg were stocked at 30 PL m<sup>-3</sup> in each pens. Two isocaloric (~15.0 MJ DE kg<sup>-1</sup>) test diets were formulated to contain two different dietary protein 35 and 40%. The daily feeding level was divided into equal two amounts and fed twice a day at three different feeding times (9:00; 12:00 h); (9:00; 15:00 h) and (9:00; 18:00 h). The highest survival rate, weight gain and specific growth rate ( $p \leq 0.05$ ) were observed for PL fed diet with 35% CP. The same trend was observed for PL fed with feeding time 9:00, 15:00 h. The PL fed diet containing 35% protein showed the highest ( $p \leq 0.05$ ) protein efficiency ratio, protein productive value, fat retention, energy retention and the better feed conversion ratio. Meanwhile, the PL fed at feeding time 9:00, 18:00 h recorded the better feed conversion ratio. No significant difference was showed for the effect of dietary protein on whole body moisture and protein contents. The highest whole body contents of crude fat and gross energy were observed for prawn fed the diet with 35% CP. However, PL fed at 9:00, 15:00 h had the highest whole body protein and lower fat contents ( $p \leq 0.05$ ). Irrespective of dietary proteins or feeding times, *M. rosenbergii* male recorded the better growth performance and feed utilization than female in all scenarios. The obtained findings revealed that *M. rosenbergii* PL fed the diet containing 35% CP at feeding time 9:00; 15:00 h is recommended to obtain optimum growth performance and feed utilization.

Chowdhury, M.A.K. ; Gopal Das, N. ; El-Haroun, E. ; Bose, M.L. 2008.

**Salinity preference of two diatoms and their growth performance in three prepared and two alternative on-farm media sources.** Journal of Applied Aquaculture 20(2):93-107.

Salinity and preferred nutrient composition of *Chaetoceros affinis* and *Skeletonema costatum* were tested. Salinity was tested at 12, 16, 23, 28, and 32 ppt. Three compositions of nitrogen (N), phosphorus (P), and potassium (K) and two on-farm low-cost alternative media sources, cow urine (CU) and hatchery waste water

(HWW), were tested to find the suitable NPK ratio and to determine the efficacy of the on-farm media respectively. *Chaetoceros affinis* preferred 23 ppt salinity, while *Skeletonema costatum* preferred both 28 and 32 ppt. Among the NPK treatments, higher cell density was observed in 4:1:1 followed by 4:2:1 ratios. Significant differences in maximum cell density of both species were observed in the NPK treatments while only *S. costatum* showed significant difference in CU and HWW.

Dawah, A.M. ; El-Naggar, G. ; Mesalhy, S. 2008.

**Field studies on prevention and biological control of the cyanobacterial blooms using *Chlorella* and *Scenedesmus* in the Nile tilapia farms.**

Abbassa International Journal of Aquaculture 1A:151-177.

This study aimed to investigate the use of green algae *Chlorella elliposoidea* (Gerneck) + *Scenedesmus bijuga* (Turpin) Lageh as prevention and biological control treatment of cyanobacterial blooms as field application. Twelve earthen ponds were randomly assigned to three groups with four replicates per each treatment. The first group served as a control. The second group (1st treatment) was seeded with *C. elliposoides* + *S. bijuga* at initial density; 20 x 10<sup>3</sup> cells ml<sup>-1</sup> (16 tons acre<sup>-1</sup> live algae) at the beginning of production season in June 2005 (as prevention treatment). The third group (2nd treatment) was seeded with the same previous density of live algae at the beginning of cyanobacterial bloom (as therapeutic treatment). The alga found on most samples was *Anabaena* sp., recorded on 33 of the 36 samples and was absent from the counts only in January and February. The greatest number of species and individuals were seen between June and July. These species occurred in quantities that could be considered strong cyanobacterial blooms. The highly abundant species was *Microcystis aeruginosa*, which showed black blooms when the weather was cold (temperature ~7 °C). Other species showed somewhat limited blooms (*Gloeocapsa rupestris* and *Chroococcus* sp.) in January. All other species were scarce and their number was fluctuating throughout the study period. The abundance of cyanobacteria was minimum in T1 in the first three months of grow-out periods. The green algae were the dominant in the T1 which inoculated by *Chlorella* + *Scenedesmus* sp. as prevention treatment for three months of grow-out period and reached a minimum level in the last months. The highest number of cyanobacteria was in the control and T2 during all grow-out periods. On the other hand, the concentration of cyanobacteria decreased sharply after inoculation of *Chlorella* + *Scenedesmus* at the beginning appearance of cyanobacterial bloom in T2. The highest green algae lead to the highest biomass of rotifera. Cladocera were found to exhibit an opposite trend. In this study, the application of green algae at a dose of 20 x 10<sup>3</sup> cells ml<sup>-1</sup> (16 tons acre<sup>-1</sup> live algae) can prevent and control the cyanobacterial blooms for two months in Nile tilapia farms.

Diab, A.S. ; Aly, S. M. ; John, G. ; Abde-Hadi, Y. ; Mohammed, M.F. 2008.

**Effect of garlic, black seed and Biogen as immunostimulants on the growth and survival of Nile tilapia, *Oreochromis niloticus* (Teleostei: Cichlidae), and their response to artificial infection with *Pseudomonas fluorescens*.** African Journal of Aquatic Science 33(1):63-68.

Three dosage levels of black seed, garlic and commercial Biogen were administered for three months in summer and six months in winter to test their stimulation effect on growth, survival and response to challenge infection in *Oreochromis niloticus*. At the end of summer, no significant difference was observed in the growth performance of *O. niloticus* with most treatments, but the level of non-specific mortalities was reduced in all treatment groups compared to the control group. Significant changes were seen in nitroblue tetrazolium (NBT) values in groups treated with 1.0 and 3.0% garlic. Mortalities following challenge with *Pseudomonas fluorescens* were lower in the groups that received garlic compared to the other two treatments. At the end of winter a significant increase in body weight gain was seen in fish fed a 1% garlic-enriched diet. Significant changes were also noted in condition factor in fish fed with 2% garlic and 1.5% Biogen. Non-specific mortality was reduced in all groups that received immunostimulants, except Biogen. Immunostimulants improved the general health of the fish, enabling them to overcome stress due to cold during winter, thereby improving growth.

Hall, S.J. ; Rogers, S.I. ; Thrush, S.F. 2008.

**Continental-shelf benthic ecosystems: prospects for an improved environmental future. p. 295-308 In: Polunin, N. (ed.) Aquatic ecosystems: trend and global prospects.** Cambridge University Press, UK.

Continental-shelf benthic systems support a major component of global fisheries production, exert important controls on marine productivity and contain rich and varied marine communities. This chapter attempts to explore key issues influencing the likely future of continental shelf ecosystems at a global scale, in particular 1) the key human induced drivers of change for soft-sediment continental shelves 2) society's aspirations for these ecosystems and 3) the impediments and opportunities for meeting these aspirations within a 2025 time horizon.



Kambewa, E. ; Ingenbleek, P. ; Van Tilburg, A. 2008.

**Improving income positions of primary producers in international marketing channels: the Lake Victoria EU Nile perch case.** Journal of Macromarketing 28(1):53-67.

Although fair distribution of incomes within marketing channels and systems receives increasing attention in companies' corporate social responsibility policies, the marketing literature offers few insights that may be helpful to initiate projects that improve incomes of primary producers in mainstream marketing channels. This article deals with the question of how projects that aim at increasing primary producers' incomes can be initiated in mainstream marketing channels: Who is the channel member that is best suited to take initiative, and why should it be this partner? The study analyzes problems at primary levels of a fresh fish channel from East Africa to the European Union, and it examines from downstream whether channel partners are aware of the problems and how responsible they feel for them, and it assesses their willingness to take action. Propositions on the initiation of projects that improve primary producers' incomes are developed and implications are discussed.

Khaw, H.L. ; Ponzoni, R.W. ; Danting, M.J.C. 2008.

**Estimation of genetic change in the GIFT strain of Nile tilapia (*Oreochromis niloticus*) by comparing contemporary progeny produced by males born in 1991 or in 2003.** Aquaculture 275:64-69.

Genetic change in the Genetically Improved Farmed Tilapia (GIFT) Nile tilapia (*Oreochromis niloticus*) was estimated by comparing the performance of the progeny produced from cryopreserved spermatozoa from the base population with that produced by freshly collected spermatozoa from the ninth generation. The comparison involved artificial fertilization of 13 males from each generation (base and ninth) with a random sample of 18 female brood stock. The progeny produced went through a 120 day grow-out period, after which live weight, standard length, body depth and survival were recorded. The estimated total genetic change in live weight was 64% over nine generations, or 7.1% generation. The genetic change was lower than the estimate reported by Eknath et al. [Eknath, A.E., Dey, M.M., Rye, M., Gjerde, B., Abella, T.A., Sevilleja, R., Tayamen, M.M., Reyes, R.A., Bentsen, H.B., 1998. Selective breeding of Nile tilapia for Asia. 6th World Congress on Genetics Applied to Livestock Production (vol. 27). University of New England, Armidale, Australia, pp 89-96.], but in the present experiment the time span included generations in which there was no selection. We conclude that GIFT is a

superior Nile tilapia strain, from which farmers can benefit due to its fast growth rate. The improvement in the latter trait was achieved without any deterioration in survival rate, which has remained high.

Lugten, G. ; Andrew, N.L. 2008.

**Maximum sustainable yield of marine capture fisheries in developing archipelagic states: balancing law, science, politics and practice.** International Journal of Marine and Coastal Law 23:1-37.

The contemporary legal regime for marine capture fisheries is dominated by management based on maximum sustainable yield (MSY). This study examines the law, science, politics and practice of MSY in a selection of developing archipelagic states to assess whether and how MSY is being used in the management of single fish species and as part of a broader ecosystem approach to fisheries management.

Mesalhy Aly, A.S. ; Abdek-Galil Ahmed, Y. ; Abdel-Aziz Ghareeb, A. ; Mohamed, M.F. 2008.

**Studies on *Bacillus subtilis* and *Lactobacillus acidophilus*, as potential probiotics, on the immune response and resistance of *Tilapia nilotica* (*Oreochromis niloticus*) to challenge infections.** Fish & Shellfish Immunology 25(1/2):128-136.

The probiotic activity of two bacteria (*Bacillus subtilis* and *Lactobacillus acidophilus*) was evaluated by its effect on the immune response of Nile tilapia (*Oreochromis niloticus*), beside its protective effect against challenge infections. Furthermore, their in-vitro inhibitory activity was evaluated. The in-vitro antimicrobial assay showed that *Bacillus subtilis* and *Lactobacillus acidophilus* inhibited the growth of *A. hydrophila*. The *B. subtilis* inhibited the development of *P. fluorescens* while *L. acidophilus* inhibited the growth of *Strept. iniae*. The *B. subtilis* and *L. acidophilus* proved harmless when injected in the *O. niloticus*. The feed, containing a mixture of *B. subtilis* and *L. acidophilus* or *B. subtilis* alone, showed significantly greater numbers of viable cells than feed containing *L. acidophilus* only after 1, 2, 3 and 4 weeks of storage at 4°C and 25°C. The survival rate and the body-weight gain were significantly increased in the fish given *B. subtilis* and *L. acidophilus* for one and two months after application. The hematocrit values showed a significant increase in the group that received the mixture of *B. subtilis* and *L. acidophilus* compared with the control group. The nitroblue tetrazolium (NBT) assay, neutrophil adherence and lysozyme activity, showed a significant increase in all the probiotic-treated groups

after 1 and 2 months of feeding, when compared with the untreated control group. The serum bactericidal activity was high in the group that was given a mixture of the two bacteria. The relative level of protection (RLP) was significantly higher against *A. hydrophila*, in the bacterial mixture treated group and against *P. fluorescens* in the *L. acidophilus* treated group, after one month of the feeding trial. A significantly higher RLP, against *A. hydrophila* or *P. fluorescens*, was noticed after 2 months of the feeding trial in the group given a mixture of the two bacteria, and against *Strept. iniae* in the group fed a diet containing *L. acidophilus*.

Mesalhy Aly, S. ; Abd-El-Rahman, A.M. ; John, G. ; Mohamed, M.F. 2008.

**Characterization of some bacteria isolated from *Oreochromis niloticus* and their potential use as probiotics.** *Aquaculture* 277:1-6.

A total of one thousand *Oreochromis niloticus* held in earthen ponds of the WorldFish Center were used in this study. Forty of these were randomly collected from the ponds and subjected to bacteriological and pathological examination where a variety of 80 bacteria were isolated. Among those 15 bacterial isolates were examined for their probiotic activity through studies performed in vitro and in vivo. *Aeromonas hydrophila*, *Citrobacter freundii*, *Pseudomonas* species and two Gram-positive isolates (*Bacillus pumilus* and *Bacillus firmus*) were identified. A total of 120 *O. niloticus* were used to evaluate the pathogenicity of *Aeromonas hydrophila* and 240 *O. niloticus* were used to assess the safety of the isolated probiotics. Three out of the 15 isolates examined (*B. pumilus*, *B. firmus* and *C. freundii*) showed inhibitory effects against *A. hydrophila* in vitro and did not cause either disease signs or mortalities in case of *B. pumilus* and *B. firmus* when injected into the fish. Diets were prepared and supplemented with isolates which showed the greatest promise as probiotics. The viability of the bacteria in the diets was assessed following storage of the diet at 4 and 25 °C for five weeks. *B. pumilus* survived at either 4 °C or 25 °C for five weeks. *B. firmus* and *C. freundii* survived at 4 °C at week 5 and week 4 of storage respectively, but they were no longer viable in the feed stored at 25 °C after 2 and 1 weeks of storage, respectively. Feeding experiments were conducted on 600 *O. niloticus* using the diets containing single or mixed isolated probiotic bacteria. A challenge test was carried out on the fish fed supplement diets using pathogenic *A. hydrophila* to assess their disease resistance to the bacterium. Fish that received feed supplemented with probiotics showed no evidence of disease after challenge infection. Survival was highest with fish fed diets supplemented with *B. pumilus*, followed by a mixture of probiotics, and then *C. freundii*. *B. pumilus* appears promising as a probiotic for controlling *A. hydrophila* infection among *O. niloticus*.

Mesalhy Aly, S. ; Hasanin, S.I.A. ; Hssab-Alla, A.Z. 2008.

**Impact of Saturn herbicide on histological structures and residual aspects of Nile tilapia (*Oreochromis niloticus*).** Egyptian Journal of Comparative Pathology and Clinical Pathology 21(1):259-274.

This investigation was performed to demonstrate the effect of Saturn herbicide on Nile tilapia (*Oreochromis niloticus*). Experimental studies were done to determine of LC<sub>50</sub> of Saturn and evaluate its acute and chronic toxicity (1/2 LC<sub>50</sub> for 7 days and 1/10 LC<sub>50</sub> for 60 days). The pathological changes were recorded. The residual contents of the fish tissues (the gills, brain, skin, muscles and ovaries) were estimated. The clearance test was studied by transferring some of chronic Saturn-exposed fish in clear water for 21 days. From the obtained results LC<sub>50</sub> after 96 hrs. for Saturn was 8.2 mg/L. Circulatory and degenerative as well as necrotic changes were seen together with tissues residues in the gills, brain, skin, muscles and ovaries. These residues were decreased and some of the histological alterations observed were completely restored. The brain revealed perivascular melanomacrophages proliferation after the recovery period (21days). We can conclude that the investigated Saturn herbicide induced a negative impact on the quality of Nile tilapia as manifested by the marked changes in fish morphology, tissue structures and residues.

Mesalhy Aly, S. ; Mohamed, M.F. ; John, G. 2008.

**Effect of probiotics on the survival, growth and challenge infection in Tilapia nilotica (*Oreochromis niloticus*).** Aquaculture Research 39:647-656.

This study was conducted in order to evaluate the potential benefit of *Bacillus pumilus* and a commercial product ('Organic Green'<sup>TM</sup>) as a probiotic in the culture of the tilapia nilotica. Two doses of *B. pumilus* (10<sup>6</sup> and 10<sup>12</sup> g<sup>-1</sup> diet fed) and Organic Green<sup>TM</sup> (1 and 2 g kg<sup>-1</sup> diet fed) were used as feed additives and administered for periods of 1 (groups 2, 3, 4 and 5 respectively) and 2 (groups 6, 7, 8 and 9 respectively) months; group 1 served as a control. Each group consisted of 4 equal replicates of 320 fish. Body weight, nitroblue tetrazolium (NBT) activity, haematocrit values and total and differential leucocytic counts (TLC and DLC) were recorded in each group after 1 and 2 months. At the end of the experiment (8 months), survival and individual body weights were recorded. Challenge infections were performed after 1, 2 and 8 months using 0.5mL culture suspension of a pathogenic reference strain of *Aeromonas hydrophila* (10<sup>8</sup> bacteriamL<sup>-1</sup>). The NBT values were increased significantly in all treated groups, except those administered *B. pumillus* (groups 3 and 6). There were significant changes in haematocrit values and TLC

and DLCs in the treated groups, except group 3, which showed a significant increase in TLC, lymphocytes and monocytes. There was a statistically significant increase in the individual body weight in groups 5, 6, 8 and 9. The survival rates of all treatment groups were higher than the control group, the differences being statistically significant in groups 3 and 9. The challenge infection showed a variable response with the type and dose of treatment and the period of application. The highest relative levels of protection were an average increase of 62.5% after 1 month (groups 3 and 5), 55.6% after 2 months (group 7) and 15.8% after 8 months (groups 8 and 9). Overall, both types of probiotics induced a similar effect. The results show the potential of using probiotics to enhance immune and health status and improve disease resistance in *Oreochromis niloticus*, thereby improving growth performance. However, further extensive testing, including a full commercial cost-benefit analysis, is necessary before recommending their application in aquaculture.

Mills, D.J. ; Johnson, C.R. ; Gardner, C. 2008.

**Bias in lobster tethering experiments conducted for selecting low-predation release sites.** Marine Ecology Progress Series 364:1-13.

Juvenile spiny lobsters *Jasus edwardsi*, grown in tanks for 1 yr following capture as pueruli, may be released to coastal reefs in Tasmania, Australia, to offset possible stock depletion resulting from the harvest of pueruli for commercial culture. We assessed the utility of tethering experiments for selecting sites with low predation pressure appropriate for lobster releases, and address a concern that experimental artefacts are likely to vary across sites, providing biased estimates of relative mortality. A multicamera surveillance system used to observe tethered juvenile lobsters at 4 isolated reefs revealed low diversity of predators, which included wrasse (45% of observed predation events), octopus (21%), crabs (17%) and large lobsters (16%). Wrasse and octopus were the dominant predators at 3 of the 4 sites, while crabs and large lobsters dominated the fourth. Survival rates in 48 h tethering trials varied substantially (24.4 to 62.2%) among sites. Tethers substantially increased the success rates of all predators in a reef mesocosm. The magnitude of the tethering effect was similar for wrasse and octopus, while large lobsters caught relatively few untethered juvenile lobsters, and crabs appeared incapable of catching untethered lobsters. Survival rates for each site were adjusted by applying a site-specific correction factor calculated using knowledge of predator suites at each site and magnitude of tethering bias for each predator. Corrected survival rates did not vary among sites, and the rank order of sites in terms of predation rates did not change following correction; overall, there was a significant correlation between adjusted and unadjusted values. Our results suggest that tethering trials are appropriate as a

tool for selecting release sites only if complementary data on predator assemblages and tethering artefacts are collected with sufficient rigour to enable calculating site-specific correction factors.

Murshed-E-Jahan, K. ; Beveridge, M.C.M. ; Brooks, A.C. 2008.

**Impact of long-term training and extension support on small-scale carp polyculture farms of Bangladesh.** *Journal of the World Aquaculture Society* 39(4):441-453.

One of the unique features of the Development of Sustainable Aquaculture Project of the WorldFish Center, Bangladesh, was the provision of 3 y of continuous training and extension in support of the fish farmers involved. It was expected that the long-term support would make a significant contribution to boosting production and incomes as well as sustainability. The article demonstrates the impact of the training and extension support to small-scale carp polyculture farmers in terms of productivity, profitability, and efficiency. The study used data collected from 225 project farmers and 123 control farmers during 2002/2003 to 2005/2006. The results show that the project farmers achieved an average growth rate in productivity terms (kg/ha) of about 23% per annum compared with only 3.8% among control farmers. Estimated annual return on investment per demonstration farm exhibits 52% higher return over the 3-y intervention period. During 2002/ 2003 to 2005/2006, the average technical efficiency score of project farmers increased from 0.55 to 0.86 compared with an average increase from 0.67 to 0.78 among control farmers over the same time period. The results showed that the efficiency gains and resulting increased productivity came from the development of human capital through long-term efficient and effective training and extension support.

Mustafa, M.G. ; Brooks, A.C. 2008.

**Status of fisheries resource and management approach in the open beels of Bangladesh: a comparative case study.** *Asian Fisheries Science* 21:189-203.

A fish catch monitoring program was introduced in Ashura beel, Goakhola beel and Dikshi beel in 1997 through the Community Based Fisheries Management (CBFM) project. The project focused on developing community management approaches which would encourage participation of the fishers, beneficiaries and community in sustainable management of the fishery resources. The present study conducted in all three open beels indicated that the 2002 annual fish production increased by 359 and 222% compared to the base line survey in 1997 in Goakhola and Dikshi beels, respectively, but only 53% in Ashura beel. The catch per person per day increased

by 50 and 123% in Goakhola and Dikshi, respectively, but decreased by 40.5% in Ashura beel as compared to the base line catch in 1997. Species diversity was higher in Ashura and Dikshi beels in 2002 than in 1997; however, Goakhola beel was more diverse in 1997. Estimated MSY for Ashura, Goakhola and Dikshi was 48.0, 23.0 and 78.0 tons, and corresponding fishing effort 16452, 7812 and 19984 gear days-year<sup>-1</sup>, respectively. Analysis of effort data indicated that maximum fishing pressure has been reached or exceeded for all three floodplain beels and any further increase in catch effort should be restricted.

Mustafa, M.G. ; De Graff, G. 2008.

**Population parameters of important species in inland fisheries of Bangladesh.** Asian Fisheries Science 21:147-158.

The von Bertalanffy growth model parameters (L8 and K) and mortality coefficients (Z, M and F) were estimated for 12 fish species caught by fishers in five Community-Based Fisheries Management project sites in Bangladesh. The exploitation ratio ( $E=F/Z$ ) and gear selectivity (L50) were also estimated for each species. The growth and exploitation parameters obtained were compared with available estimates to evaluate the consistency of the results with current knowledge about the species in the region. The estimates for L8 (7.0 – 24.0 cm) and K ( $1.077 \pm 0.328$  year<sup>-1</sup>) obtained were consistent with those available in literature. Relatively high K (and low L8) values, typical of short-lived tropical fishes, were obtained for nine species. Estimates for Z (1.86 – 6.55) and M (1.22 - 3.06) imply low annual rates of survival and high turnover rates. The estimates for M obtained were consistent with those available in the literature for the 12 species. The exploitation rate was estimated to be between 34 and 53% and the length at first capture was estimated to be approximately 32-56% of L8. The study indicated that the length-at-first-capture/L8 seems to be a simple parameter which could be used to make a rapid assessment of the status of the stocks.

Ponzoni, R.W. ; Nguyen, N.H. ; Khaw, H.L. ; Ninh, N.H. 2008.

**Accounting for genotype by environment interaction in economic appraisal of genetic improvement programs in common carp *Cyprinus carpio*.** Aquaculture 285:47-55.

In this study we examine effects of genotype by environment (G×E) interaction due to re-ranking and scaling effects on economic benefit (EB) and benefit to cost ratio (BCR) from a genetic improvement program in common carp at a national level in Vietnam. A discount approach was used for the economic evaluation over a 10 year time horizon. G×E interaction resulting from scaling effects generally had a negligible

impact on EB and BCR. However, both EB and BCR decreased with the magnitude of the G×E (i.e. with the decrease in the genetic correlations between homologous traits in the selection and production environments). Furthermore, both EB and BCR from the genetic improvement program depend on other factors, which can be categorized in three groups: i) biological (heritability and feed intake), ii) economic (initial investment, annual recurrent cost, discount rate, price of fish and feed cost) and iii) operational (year when first return is realized, adoption rates of the improved fish by the production sector). The level of heritability affected EB and BCR, with greater heritability being associated with greater EB and BCR. Accounting for feed intake in breeding objectives avoided an overestimation of EB and BCR. Generally, the economic efficiency of the breeding program was almost insensitive to initial investment and annual cost. Increasing the discount rate by three times reduced EB and BCR by a factor of only 1.4 and 2.0, respectively. The price of fish and feed costs had a substantial effect on EB and BCR. However, the greatest contribution to variations in EB and BCR came from increases in adoption rates of the improved fish by the industry. The risk program failure due to technical reasons was extremely low. We conclude that even under the most conservative assumptions, and in the presence of G×E interaction, genetic improvement programs are highly beneficial from an economic viewpoint, and that for the situations studied they could result in EBs ranging from 11 to 226 million US\$, and corresponding BCRs of 22 to 420.

Purcell, S.W. ; Simutoga, M. 2008.

**Spatio-temporal and size-dependent variation in the success of releasing cultured sea cucumbers in the wild.** Reviews in Fisheries Science 16(1-3):204-214.

Large-scale releases of cultured “sandfish,” *Holothuria scabra*, were used to examine size- and density-dependent effects on survival among sites. Juveniles were marked by fluorochromes in 3 size classes and released into open 500-m<sup>2</sup> sea pens. A preliminary trial involved the release of 4,000 juveniles at two sites. In a subsequent large-scale experiment, we released 9,000 juveniles at 0.5, 1, or 3 individuals m<sup>-2</sup> at 4 sites. Growth and survival up to 2 years post-release were estimated from successive recapture surveys and marker verification. Most of the surviving animals attained the size at first maturity (180 g) within 12 months in the preliminary trial but grew slower in the second experiment. Growth was density dependent, with carrying capacity at one site of 200–250 g sandfish m<sup>-2</sup>. Survival varied greatly among sites, explained in part by microhabitat features, but site suitability was ephemeral; previous success at sites did not guarantee success later. Juvenile size at release significantly affected long-term survival, but survival was density-independent within the experimental range. Juveniles should be released at a minimum size of 3 g and



at multiple sites and occasions to mitigate spatio-temporal variation in survival. We predict that 7–20% of sandfish released at a size of 3–10 g in optimum habitat could survive to market size, which gives qualified support for restocking. Our results also help to assess the viability of sea ranching, which will depend on sale price, harvest efficiency, and reduced costs of producing juveniles.

Ratner, B.D. ; Baran, E. 2008.

**From sound economics to sound management: practical solutions to small-scale fisheries governance in the developing world.** MAST 6(2):29-33.

This is a commentary on Daniel Bromley's paper (The crisis in ocean governance: conceptual confusion, spurious economics, political indifference). Taking into consideration the varied context of small-scale fisheries in developing countries, the authors elaborate on three unstated assumptions: information on the fishery ecology; adequate administrative capacity; and sufficiently transparent governance mechanisms, with avenues of recourse to deter elite resource capture.

Rhodes, K.L. ; Tupper, M.H. 2008.

**The vulnerability of reproductively active squaretail coral grouper (*Plectropomus areolatus*) to fishing.** Fishery Bulletin 106(2):194-203.

Squaretail coral grouper (*Plectropomus areolatus*) were captured and tagged at a fish spawning aggregation (FSA) site with conventional and acoustic tags to assess their vulnerability to fishing and spatial dynamics during reproductive periods. Males outnumbered females in catch and, on average, were larger than females. Findings revealed a high vulnerability to fishing, particularly during reproductive periods, and most fish were recaptured within the 5-month spawning season and within 10-12 km of the aggregation site. Individual and sex-specific variability in movement to, and residency times at, the FSA site indicates that individual monthly spawning aggregations represent subsets of the total reproductive population. Some individuals appeared to move along a common migratory corridor to reach the FSA site. Sex-specific behavioral differences, particularly longer residency times, appear to increase the vulnerability of reproductively active males to fishing, particularly within a FSA, which could reduce reproductive output. Both fishery-dependent and fishery-independent data indicate that only males were present within the first month of aggregation. The combined results indicate that reproductively active *P. areolatus* are highly vulnerable to fishing and that FSAs and migratory corridors of reproductively active fish should be incorporated into marine protected areas. The capture of *P. areolatus* during reproductive periods should be restricted as part of a comprehensive management strategy.

Salayo, N. ; Garces, L. ; Pido, M. ; Viswanathan, K. ; Pomeroy, R. ; Ahmed, M. ; Siason, I. ; Seng, K. ; Masae, A. 2008.

**Managing excess capacity in small-scale fisheries: perspectives from stakeholders in three Southeast Asian countries.** *Marine Policy* 32:692-700.

The management of fishing capacity in both inland and marine fisheries is a major policy concern in most countries in Southeast Asia. Excess capacity leads to a number of negative impacts, such as resource use conflicts, overfishing, environmental degradation, economic wastage, and security threats. This paper presents the results of a regional study that examined various approaches to managing excess fishing capacity in small-scale fisheries in Southeast Asia. More specifically, the paper presents an analysis of perceptions of stakeholders in Cambodia, Philippines and Thailand regarding preferred solutions to addressing excess capacity. The paper concludes with a discussion of policy guidance for addressing excess fishing capacity based on the stakeholder-preferred solutions.

Sheriff, N. ; Little, D.C. ; Tantikamton, K. 2008.

**Aquaculture and the poor: Is the culture of high-value fish a viable livelihood option for the poor?** *Marine Policy* 32:1094-1102.

This study evaluates the role of high-value fish culture in the livelihoods of coastal households in southern Thailand. The study shows that grouper culture, promoted as an alternative to destructive fishing practices, can make a substantial contribution to household incomes. However, fishing and aquaculture play contrasting roles in the livelihoods of coastal fishers and should be considered as complementary rather than alternative occupations. The study found that poorer households can benefit significantly from raising grouper in cages if certain conditions are met, including access to credit and the substitution of financial for natural capital.

Tewfik, A. ; Andrew, N.L. ; Béné, C. ; Garces, L. 2008.

**Reconciling poverty alleviation with reduction in fisheries capacity: boat aid in post-tsunami Aceh, Indonesia.** *Fisheries Management and Ecology* 15:147-158.

The tremendous loss of life and assets resulting from the 2004 tsunami dealt a devastating blow to the coastal communities of Aceh Province, Indonesia. An assessment of the fishing fleet structure pre- and posttsunami, including associated pattern in boat aid, in 15 coastal communities was conducted and compared with data on boat relief efforts over 17 districts of the Province. Aid was found to be

not proportionally allocated to losses incurred by communities and was in many cases below what could be seen as a trend toward overcapacity. The distribution of aid appeared to be done without consideration of the former structure of the fleet, which changed significantly over time (pre- and post-tsunami), and resulted in a new fleet of reduced diversity with a strong focus on the smaller boat categories. If this situation perpetuates after the initial post-disaster period, it may further exacerbate the pre-existing economic and geographic marginalisation of some remote communities, and reduce the capacities of the fleets to diversify and develop multi-species harvesting strategies; thus, increasing the risk of ecologically unsustainable exploitation in near shore areas.

## NON REFEREED PUBLICATIONS

Abou Zead, M.Y. ; Soltan, M.A. ; Ibrahim, M.S. 2008.

**Effect of replacing soybean meal by sunflower meal in the diets for Nile tilapia, *Oreochromis Niloticus*.** p. 787-798. In: Elghobashy, H., Fitzsimmons, K., Diab, A.S. (eds.) Proceedings of 8th International Symposium on Tilapia in Aquaculture, Cairo, Egypt, 12-14 Oct 2008. Vol. 2.

This study highlights the potential of using sunflower meal for partial or complete replacement for soybean meal in Nile tilapia diets. Generally, results of the study showed the possibility of replacing of soybean meal by sunflower meal up to 75% with no adverse effect on growth performance and feed utilization.

Al-Kenawy, D. ; El-Naggar, G. ; Abou Zead, M.Y. 2008.

**Total replacement of fishmeal with soybean meal in diets for Nile tilapia in pre-fertilized ponds.** p. 773-784. In: Elghobashy, H., Fitzsimmons, K., Diab, A.S. (eds.) Proceedings of 8th International Symposium on Tilapia in Aquaculture, Cairo, Egypt, 12-14 Oct 2008. Vol. 2.

This study was conducted to investigate the effect of replacing fishmeal with soybean meal in diets with different levels of dietary protein on the production economics of Nile tilapia. The results demonstrate that soybean meal could replace the fish meal in diets for Nile tilapia without negative effects on growth, or on total production and even leading to high net economic returns in case of using diets with 25% protein from plant source.

Baran, E. ; Warry, F. 2008.

**Simple data analysis for biologists.** WorldFish Center contribution no. 1881, 67 p. The WorldFish Center, Penang.

This document provides a simple introduction to research methods and analysis tools for biologists or environmental scientists, with particular emphasis on fish biology in developing countries.

Bellagio Sea Turtle Conservation Initiative. Steering Committee. 2008.

**Strategic planning for long-term financing of Pacific leatherback conservation and recovery.** WorldFish Center Conference Proceedings 1805, 79 p. The WorldFish Center, Penang.

On 17-20 July 2007, 45 experts on sea turtles, fisheries, conservation and finance from 10 countries convened at the Bellagio Sea Turtle Conservation Initiative

workshop in Terengganu to focus on methods to save the imperiled Pacific leatherback from extinction. The group developed a strategic plan to guide the prioritization and long term financing of Pacific leatherback turtle conservation and recovery objectives. Participants identified critical conservation actions and agreed that a business plan is urgently needed to reverse the trajectory towards extinction of the Pacific leatherback. The conservation actions prioritized by the participants encompassed protecting nesting beaches including eggs and nesting females; reducing direct and indirect turtle take in coastal fisheries; and strengthening regional and sub-regional cooperation. The group committed to work together on fundraising and implementation of these urgent conservation actions. This report presents outputs and the plan that was produced from the workshop.

Béné, C. 2008.

**Global change in African fish trade: engine of development or threat to local food security?** OECD Food, Agriculture and Fisheries Working Papers no. 10. Paris, OECD Publishing.

Today fish is the most traded food commodity in the World. This situation is not without generating potential issues. On the one hand, fish trade is said to support economic growth processes in developing countries by providing an important source of cash revenue. On the other hand, fish trade is also said to lead to a decline in food security and a decrease in the availability of fish for the local population. In this paper we explore more thoroughly those two opposite views in the specific case of sub-Saharan Africa. For this we consider a range of eight national development indicators that encapsulate both economic and wellbeing of sub-Saharan countries over the last decade and correlate them against four indicators reflecting the country-specific importance of fish trade, industrial and small-scale fisheries in the economy of Sub-Saharan Africa. Our statistical analysis shows that when sub-Saharan countries' data are considered at the macro-economic level the fear that fish trade may affect negatively fish food security is not substantiated by any statistical evidences. At the same time the analysis also shows no evidence to support the claim that international fish trade contributes effectively to national economic development and/or wellbeing. The last section of the paper discusses the various possible reasons for this apparent lack of correlation and highlights the respective flaws underlying the two opposite discourse about the role of fish trade in national development and food security.

Brugère, C. ; Holvoet, K. ; Allison, E.H. 2008.

**Livelihood diversification in coastal and inland fishing communities: misconceptions, evidence and implications for fisheries management.**

Working paper, Sustainable Fisheries Livelihoods Programme (SFLP), Rome, FAO/DFID

The paper starts with a review of the concept of diversification, encompassing its associated dimensions, typology and influencing factors. Linkages between diversification and poverty are also briefly outlined in this section. The case of diversification in fishing communities is made in the third part of the paper, exploring misconceptions in greater depth, providing case study evidence to dispel them and highlighting consequences of inappropriately designed and targeted policies on fisher folks. Implications of diversification in relation to the state of fisheries resources and their management are explored in the fourth and last part of the paper.

Brummett, R.E. ; Pouomogne, V. 2008.

**Small-scale aquaculture business planning in Cameroon.** p. 679-691.

In: Elghobashy, H., Fitzsimmons, K., Diab, A.S. (eds.) Proceedings of 8th International Symposium on Tilapia in Aquaculture, Cairo, Egypt, 12-14 Oct 2008. Vol. 1.

In Cameroon, the principal objective set out for the aquaculture sector is to sustainably improve farmer incomes. To be profitable and sustainable investments in aquaculture businesses need to achieve a scale sufficient to allow for the purchase of inputs, the hiring of labour and the marketing of outputs for cash income. At present, political instability and poor governance in many African countries mitigate in favour of very large-scale farms that can absorb risk. However, within the range of possible scales, small and medium enterprises generate more employment and equitable economic growth than large scale investments. Participatory, on farm, action research in Cameroon has elaborated a tool, the Aquaculture Business Planning Assistant, that can help governments and smaller investors identify the basic production system that can achieve a minimum profitable scale.

Choo, P.S. 2008.

**The Philippines: a hotspot of sea cucumber fisheries in Asia.** p. 119-140. In: V. Toral-Granda, A. Lovatelli and M. Vasconcellos (eds). Sea cucumbers. A global review of fisheries and trade. FAO Fisheries and Aquaculture Technical Paper. No. 516. Rome, FAO.

This article provides an overview of the sea cucumber fisheries in the Philippines, covering topics of 1) trade, 2) socioeconomic importance to local community 3) recommendations for improving fisheries management and conservation of sea cucumber populations.

Choo, P.S. 2008.

**Population status, fisheries and trade of sea cucumbers in Asia.** p. 81-118. In: V. Toral-Granda, A. Lovatelli and M. Vasconcellos (eds). Sea cucumbers. A global review of fisheries and trade. FAO Fisheries and Aquaculture Technical Paper. No. 516. Rome, FAO.

This regional review on the population status, fisheries and trade of commercially important sea cucumbers in Asia covers the east and southeast Asian regions including Indonesia, Malaysia, Thailand, Myanmar, Viet Nam, Philippines, Singapore, the Spratly Islands, Japan, Democratic People's Republic Korea, Republic of Korea, Far East Russian Federation, China Hong Kong Special Administrative Region (SAR) and Taiwan Province of China (PC).

Cohen, P. ; Valemei, A.D. ; Govan, H. 2008.

**Annotated bibliography on socio-economic and ecological impacts of marine protected areas in Pacific Island countries.** 36 p. The WorldFish Center, Penang.

The bibliography is to highlight impacts on fisheries and livelihoods attributed to coral reef marine protected areas in Pacific Island countries and territories. Included in this collection is literature that reports various forms of reef area management practiced in Pacific Island countries: reserves, sanctuaries, permanent or temporary closed areas, community and traditional managed areas.

Desurmont, A. ; Purcell, S.W. 2008.

**Sea cucumber identification cards: an analysis of their utility in the Pacific.** SPC Beche de Mer Information Bulletin 27:5-7.

Fisheries management personnel and other stakeholders need a means of ensuring consistency when identifying the various species exploited within a fishery. We

conducted a questionnaire-based survey to evaluate the usefulness of SPC's "Pacific Island sea cucumber and beche-de-mer identification cards". Quality photographs of live animals were the most valuable information. The usefulness of other information depended on the user group, and whether users were from large, developed countries or small Pacific Island nations. A key finding is that the content and format in which the information is presented should largely be dictated by the intended user group. In this case, waterproof identification cards were considered by users as important tools in aiding in the identification of sea cucumber species, which can lead to improved data collection and fisheries management.

Dey, M.M. ; Bose, M.L. ; Alam, M.F. 2008.

**Recommendation domains for pond aquaculture: country case study: development and status of freshwater aquaculture in Bangladesh.**

WorldFish Center Studies and Reviews 1872, 73 p. The WorldFish Center, Penang.

This report is an output of the project "Determination of high-potential aquaculture development areas and impact in Africa and Asia". This monograph is the case study for Bangladesh. Written in three parts, it describes the historical background, practices, stakeholder profiles, production levels, economic and institutional environment, policy issues, and prospects for aquaculture in the country. First, it documents the history and current status of the aquaculture in the country. Second, it assesses the technologies and approaches that either succeeded or failed to foster aquaculture development and discusses why. Third, it identifies the key reasons for aquaculture adoption.

Dey, M.M. ; Briones, R.M. ; Garcia, Y.T. ; Nissapa, A. ; Rodriguez, U.P. ; Talukder, R.K. ; Senaratne, A. ; Omar, I.H. ; Koeshendrajana, S. ; Khiem, N.T. ; Yew, T.S. ; Weimin, M. ; Jayakody, D.S. ; Kumar, P. ; Bhatta, R. ; Haque, M.S. ; Rab, M.A. ; Chen, O.L. ; Luping, L. ; Paraguas, F.J. 2008.

**Strategies and options for increasing and sustaining fisheries and aquaculture production to benefit poorer households in Asia** [PDF in letter standard]. WordFish Center Studies and Reviews 1823, 180 p. The WorldFish Center, Penang.

The last three decades have witnessed dramatic changes in the structure of supply and demand for fish, especially in Asia. This WorldFish research study sponsored by the Asian Development Bank focussed on nine developing countries – Bangladesh,



China, India, Indonesia, Malaysia, the Philippines, Sri Lanka, Thailand, and Vietnam, all active players in the transformation of global fish supply and demand. The study, broken into five components and reported here, considered: 1) the profile of key aquaculture technologies and fishing practices; 2) analysis of policies, institutions and support services; 3) socioeconomic profile of major stakeholders in the fisheries sector; 4) projections of fish demand and supply in the nine Asian countries; and 5) formulation of national action plans based on the findings and recommendations of the study.

El Naggar, G.O. ; Ibrahim, N.A. ; Abou Zead, M.Y. 2008.

**Influence of fertilizers' types and stocking density on water quality and growth performance on Nile tilapia African catfish in polyculture system.** p. 157-170. In: Elghobashy, H., Fitzsimmons, K., Diab, A.S. (eds.) Proceedings of 8th International Symposium on Tilapia in Aquaculture, Cairo, Egypt, 12-14 Oct 2008. Vol. 1.

The effects of fertilizer types and stocking density were investigated on water quality parameters that expected to affect growth performance of the polyculture of Nile tilapia (*Oreochromis niloticus*), African catfish (*Claris gariepinus*) and silver carp (*hypophthalmichthys molitrix*). The purpose of this study was to determine the best type of fertilizer to use and stocking density to apply which maximizing fish yields while minimizing expenses and environmental degradation.

El-Naggar, G. ; Nasr-Alla, A. ; Kareem, R.O. 2008.

**Economic analysis of fish farming in Behera governorate of Egypt.** p. 693-707. In: Elghobashy, H., Fitzsimmons, K., Diab, A.S. (eds.) Proceedings of 8th International Symposium on Tilapia in Aquaculture, Cairo, Egypt, 12-14 Oct 2008. Vol. 1.

This paper examines the economic analysis of fish farming in Behera governorate of Egypt. High prices of fish feed, declining fish prices and lack of finance were found to be the top ranking serious constraints facing farmers in that area. The study suggests that there is need for the establishment of producers' union or association that will assist the fish farmers to increase the availability of commercial inputs, improved marketing distribution channels, creation of conducive environment for fish farming sustainability through credit facilities and public enlightenment program on investment in fish farming activities in the study area.

Garcia, S.M. ; Allison, E.H. ; Andrew, N.L. ; Béné, C. ; Bianchi, G. ; de Graaf, G. ; Kalikoski, D. ; Mahon, R. ; Orensanz, L. 2008.

**Towards integrated assessment and advice in small-scale fisheries: principles and processes.** FAO Fisheries and Aquaculture Technical Paper 515. 84 p. FAO, Rome.

This document presents the principles and processes for integrated assessment and advice in small-scale fisheries. The first chapter discusses failures of conventional assessment and management approaches. Chapter 2 presents the conceptual origins and principles of integrated assessment of small-scale fisheries. The final chapter discusses the implementation of the IAA framework.

Food and Agriculture Organization of the United Nations ; The WorldFish Center. 2008.

**Small-scale capture fisheries: a global overview with emphasis on developing countries: a preliminary report of the Big Numbers Project.** WorldFish Center Report 1885, 63 p. The WorldFish Center, Penang.

The report gives a summary of the results to-date of case studies carried out in a selected number of countries which provides a first analysis of the differences between marine and inland small and large scale fisheries in developing countries. It has been prepared for the conference “Securing Sustainable Small-scale Fisheries: Bringing together responsible fisheries and social development” in Bangkok, Thailand, on 13-17 October 2008 and is intended for policy and decision makers and others with an interest in sustainable fisheries and poverty alleviation.

Hamzah, A. ; Nguyen, N.H. ; Ponzoni, R.W. ; Kamaruzzaman, B.N. ; Subha, B. 2008.

**Performance and survival of three red tilapia strains (*Oreochromis spp*) in pond environment in Kedah state, Malaysia.** p. 199-211. In: Elghobashy, H., Fitzsimmons, K., Diab, A.S. (eds.) Proceedings of 8th International Symposium on Tilapia in Aquaculture, Cairo, Egypt, 12-14 Oct 2008. Vol. 1.

Growth performance (body weight, standard length, body width and depth) and survival of three red tilapia (*Oreochromis spp*) strains from Malaysia, Taiwan and Thailand were evaluated using 2,867 records collected on individually tagged fish after a period of three-months of communal rearing in an earthen pond. The statistical model used to analyze the data included strain, sex and their two-way interaction as fixed effects and age from stocking to harvest and initial weight

as linear covariates. The effect of strain was highly significant for all body traits ( $P < 0.001$ ). The Malaysian strain had the fastest growth rate, whereas the lowest performing strain was that from Thailand. The growth performance of the Taiwanese strain was intermediate. Across strains, body measurements of red tilapia females were significantly ( $P < 0.001$ ) smaller than those of males. The strain by sex interaction was statistically significant ( $P < 0.05$  to  $0.001$ ). We also analyzed survival rate of the fish from stocking to harvest, using a generalized non-linear model. Survival was considered as binary trait, and the model assumed that the data followed a binomial distribution, with a logit link function. In contrast to the results for body traits, survival rate was poorest for the Malaysian strain (66.4%). The difference in survival rate between Taiwan and Thai strains (78.5 vs. 80.6%) was not statistically significant ( $P > 0.05$ ). Our results suggest that there are genetic differences in growth performance and survival among red tilapia strains from Malaysia, Taiwan, and Thailand. They are thus being included in a complete diallel cross to further examine the additive and non-additive genetic performance of the strains before forming the base population for future genetic selection. In this paper, we present an outline and key activities of the planned genetic improvement program for red tilapia in Malaysia.

Ibrahim, M.D. ; Arab, R.M.H. ; Mostafa, M.M. ; Rezk, M.A. 2008.

**Evaluation of different vaccination strategies for control of (MAS) in Nile tilapia (*O. niloticus*) in Egypt.** p. 1157-1174. In: Elghobashy, H., Fitzsimmons, K., Diab, A.S. (eds.). Proceedings of 8th International Symposium on Tilapia in Aquaculture, Cairo, Egypt, 12-14 Oct 2008. Vol. 2.

The Motile Aeromonas Septicemia (MAS), caused by *Aeromonas hydrophila* is among the dangerous diseases encountered in freshwater fish culture. This work aims to compare and evaluate difference vaccination strategies for control of MAS in Nile tilapia.

Ibrahim, M.D. ; Mostafa, M.M. ; Arab, R.M.H. ; Rezk, M.A. 2008.

**Prevalence of *Aeromonas hydrophila* infection in wild and cultured tilapia nilotica (*O. niloticus*) in Egypt.** p. 1257-1270. Elghobashy, H., Fitzsimmons, K., Diab, A.S. (eds.). Proceedings of 8th International Symposium on Tilapia in Aquaculture, Cairo, Egypt, 12-14 Oct 2008. Vol. 2.

This paper aims to study the seasonal prevalence of *Aeromonas hydrophila* in naturally collected and cultured *O. niloticus*. Results showed that prevalence of the infection was higher in cultured fish during the summer season than in wild fish. The observed clinical signs in the examined fish suffering from Motile Aeromonas Septicemia (MAS) were varied septicemia, ascitis, erosion, ulceration, detachment

of scale and exophthalmia. The post mortem findings varied from congestion to focal lesions in the liver, spleen, and kidney. 25 isolates of *A. hydrophila* from sterile-intestinal organs of naturally infected Nile tilapia were collected. There was a pronounced variation in both the biochemical and enzymatic profiles within the motile aeromonas species. Variation was evident in the hemolytic activity. Similarly, there was variation in pathogenicity among the 25 isolates of *A. hydrophila*. The relation between pathogenicity and the biochemical activity is discussed.

Ibrahim, M.S. ; Wafeek, M. ; Mesalhy Aly, S. 2008.

**Effect of water hyacinth and chlorella on water polluted by heavy metals and the biochemical and pathophysiological response of exposed fish.** p. 531-549. In: Elghobashy, H., Fitzsimmons, K., Diab, A.S. (eds.) Proceedings of 8th International Symposium on Tilapia in Aquaculture, Cairo, Egypt, 12-14 Oct 2008. Vol. 1.

This study aimed to investigate the capacity of selected aquatic plant (water hyacinth and Chlorella) to remove some metal pollution from the water and the effect of such reaction on the serum bichemistry and histopathology of affected fish.

Kam, S.P. ; Barth, H. ; Pemsli, D.E. ; Kriesemer, S.K. ; Teoh, S.J. ; Bose, M.L. 2008.

**Recommendation domains for pond aquaculture.** WorldFish Center Studies and Reviews 1848, 40 p. The WorldFish Center, Penang.

This publication introduces the methods and results of a research project that has developed a set of decision-support tools to identify places and sets of conditions for which a particular target aquaculture technology is considered feasible and therefore good to promote. The tools also identify the nature of constraints to aquaculture development and thereby shed light on appropriate interventions to realize the potential of the target areas. The project results will be useful for policy planners and decision makers in national, regional and local governments and development funding agencies, aquaculture extension workers in regional and local governments, and researchers in aquaculture systems and rural livelihoods.

Khalil, R.H. ; Mesalhy Aly, S. 2008.

**Photobacteriosis in some wild and cultured freshwater fishes in Egypt.** p. 1211-1227. In: Elghobashy, H., Fitzsimmons, K., Diab, A.S. (eds.). Proceedings of 8th International Symposium on Tilapia in Aquaculture, Cairo, Egypt, 12-14 Oct 2008. Vol. 2.

Two hundred and seventy wild and cultured fishes were collected from Alexandria, and investigated for the isolation of Photobacterium. The recovered bacteria were

studied for the virulence, pathogenicity and antimicrobial sensitivity.

Mesalhy Aly, S. ; Abdel Atti, N.M. ; Mohamed, M.F. 2008.

**Effect of garlic on the survival, growth, resistance and quality of *Oreochromis niloticus*.** p. 277-295. In: Elghobashy, H., Fitzsimmons, K., Diab, A.S. (eds.) Proceedings of 8th International Symposium on Tilapia in Aquaculture, Cairo, Egypt, 12-14 Oct 2008. Vol. 1.

Study was conducted to evaluate the efficiency of the garlic in improving the immune response, survival, growth and disease resistance in Nile tilapia (*O. niloticus*). The effects on quality and shelf life of fish were also considered.

Mesalhy Aly, S. ; Mohammed, M.F. ; John, G. 2008.

**Echinacea as immunostimulatory agent in Nile tilapia (*Oreochromis niloticus*) via earthen pond experiment.** p. 1033-1041. In: Elghobashy, H., Fitzsimmons, K., Diab, A.S. (eds.) Proceedings of 8th International Symposium on Tilapia in Aquaculture, Cairo, Egypt, 12-14 Oct 2008. Vol. 2.

The study aimed to investigate the effect of Echinacea on survival and growth rates of Nile tilapia (*Oreochromis niloticus*), its immunostimulatory and disease control effects via changes in various hematological and immunological measures, and its impacts on resistance to challenge infection tests.

Mesalhy Aly, S.E. 2008.

**Impact of diseases on marine fish production (diagnosis & control).** p. 1-2. In: Proceedings of Scientific Conference of Mediterranean Aquaculture & Environmental Society, Siani, Egypt. 1-2 Mar 2008.

A summary of diagnosis of fish diseases and treatment was given in this prologue to the proceeding organized by the Mediterranean Aquaculture and Environmental Society.

Neiland, A.E. ; Béné, C. (eds.). 2008.

**Tropical river fisheries valuation: background papers to a global synthesis.** WorldFish Center Studies and Reviews 1836, 290 p. The WorldFish Center, Penang.

This report is a compilation of five regional reviews that document the global status of tropical rivers and inland fisheries in three continents: Latin America, Africa and Asia. It explores the role of valuation methods and their contribution to policy making and river fishery management.

Nguyen, N.H. ; Ponzoni, R.W. 2008.

**Genetic improvement of carp reduces poverty, hunger in Asia.** Global Aquaculture Advocate 11(May/June):76-78.

Breeding programs for carp species carried out in a number of Asian countries have delivered genetically fast growing strains to farmers and producers. The economic benefits resulting from the programs are substantial. The genetic improvement of carp is one of the most profitable and sustainable ways to help poor communities in developing countries in the region.

Pemsl, D.E.; Bose, M.L.

**Recommendation domains for pond aquaculture: country case study: development and status of freshwater aquaculture in Henan Province, China.** WorldFish Center Studies and Reviews 1873. 58 p. The WorldFish Center, Penang.

This monograph is the case study for China, with a particular focus on Henan Province, the project location. Written in three parts, it first describes the historical background, production levels and trends, economic and institutional environment, policy issues, and market situation in China in general. The main part of the study presents findings from two different surveys conducted in Henan Province. County-level information is used to analyze the current situation of aquaculture, providing a more disaggregated picture than what is generally available from national statistics. Data collected in a survey of fish farmers in two locations in Henan are then analyzed with regard to the prevailing aquaculture technology and production practices, economic performance of pond fish farming, and the key reasons for aquaculture adoption. In the final chapter, constraints and opportunities for the aquaculture sector in China in general are discussed.

Ponzoni, P.W. ; Nguyen, N.H. ; Khaw, H.L. ; Kamaruzzaman, N. ; Hamzah, A. ; Bakar, K.R.A. ; Yee, H.Y. 2008.

**Genetic improvement of Nile tilapia (*Oreochromis Niloticus*): present and future.** p. 33-52. In: Elghobashy, H., Fitzsimmons, K., Diab, A.S. (eds.) Proceedings of 8th International Symposium on Tilapia in Aquaculture, Cairo, Egypt, 12-14 Oct 2008. Vol. 1.

We mainly (but not exclusively) draw upon research and development work carried out by The WorldFish Center (WorldFish). We review the current state of development of selection programs that have had a main focus on growth rate and body traits. There is evidence of sustained gains of 10 to 15 per cent per generation

over more than six generation. To date, these gains have not been accompanied by any undesirable correlated response. The prospects for altering sexual dimorphism and the shape of the fish appear to be very limited, however. We also examine the issue of the appropriate environment for selection. Not surprisingly, experimental evidence on genotype by environment interaction suggests that this is more likely to be of importance when the environments in question are markedly dissimilar. We argue that no universal guidelines can be prescribed regarding the need for more than one selection program to cope with different production environments, but that instead, each case should be examined in its own right. Finally, we discuss traits likely to be candidates for inclusion in future, more elaborate, breeding objectives for Nile tilapia, and comment on selection methods that may be implemented in the future.

Ponzoni, R.W. ; Nguyen, N.H. 2008.

**Transgenic fish: risks and benefits.** Global Aquaculture Advocate (Sept/Oct):100-102.

Advocates of transgenesis consider it an effective means of improving the productivity of aquatic animals. Opponents see it as a threat to both the environment and human health. This is a challenging area because important traits in fish are complex and controlled by multiple genes. Nevertheless, some transgenic lines of “high-growth” tilapia, salmon and carp are nearing the stage at which they could be considered for commercial production.

Pouomogne, V. ; Pemsil, D.E. 2008.

**Recommendation domains for pond aquaculture: country case study: development and status of freshwater aquaculture in Cameroon.** WorldFish Center Studies and Reviews 1871, 60 p. The WorldFish Center, Penang.

This report is an output of the project “Determination of high-potential aquaculture development areas and impact in Africa and Asia”. This monograph is the case study for Cameroon. Written in three parts, it describes the historical background, practices, stakeholder profiles, production levels, economic and institutional environment, policy issues, and prospects for aquaculture in the country. First, it documents the history and current status of the aquaculture in the country. Second, it assesses the technologies and approaches that either succeeded or failed to foster aquaculture development and discusses why. Third, it identifies the key reasons for aquaculture adoption.

Rolf, W. ; Mills, D. ; Kelleher, K. 2008.

**About more than just the size of the boat: Big Numbers Project.**  
WorldFish Center Flyer 1882, 2 p. The WorldFish Center, Penang.

The Big Numbers Project is a joint activity of the Food and Agriculture Organization (FAO) of the United Nations, World Bank and the WorldFish Center in collaboration with national partners. It is funded through PROFISH, the World Bank's global program on sustainable fishing. It aims to fill the information gap by providing disaggregated data on capture fisheries. The intention is to support the establishment of procedures that allow for the regular analyses of fisheries' status and trends. These analyses will inform policy formulation and support the provision of management advice within countries and globally.

Russell, A.J.M. ; Dobson, T. ; Wilson, J.G.M. 2008

**Fisheries management in Malawi: a patchwork of traditional, modern, and post-modern regimes unfolds.** p. 53-98. In: Schechter, M.G., N.J. Leonard & W.W. Taylor (eds.) International governance of fisheries ecosystems: learning from the past, finding solutions for the future. American Fisheries Society.

This cases study provides an overview of how the roles of different stakeholders and institutions in fisheries management have evolved during the past century in Malawi.

Russell, A.J.M. ; Grötz, P.A. ; Kriesemer, S.K. ; Pems, D.E. 2008.

**Recommendation domains for pond aquaculture: country case study: development and status of freshwater aquaculture in Malawi.** WorldFish Center Studies and Reviews 1869, 52 p. The WorldFish Center, Penang.

This monograph is a result of a 3-year project to produce a decision-support toolkit with supporting databases and case studies to help researchers, planners and extension agents working on freshwater pond aquaculture. The purpose of the work was to provide tools and information to help practitioners identify places and conditions where pond aquaculture can benefit the poor, both as producers and as consumers of fish. This monograph is the case study for Malawi. Written in three parts, it describes the historical background, practices, stakeholder profiles, production levels, economic and institutional environment, policy issues, and prospects for aquaculture in the country. First, it documents the history and current status of the aquaculture in the country. Second, it assesses the technologies and approaches that either succeeded or failed to foster aquaculture development and discusses why. Third, it identifies the key reasons for aquaculture adoption.



Sheriff, N. ; Schuetz, T. 2008.

**Monitoring for change, assessing for impact: the WorldFish Center experience.** Paper presented for the Workshop on Rethinking Impact: Understanding the Complexity of Poverty and Change, Cali, Colombia 26-29 Mar 2008.

A critical analysis of the Center's current impact assessment and Monitoring & Evaluation approaches and future directions is presented. The application of new M&E tools to large-scale projects is described, using the Challenge Project on Community-Based Fish Culture as an example. The advantages and constraints to their application to research for development are discussed in the fisheries and aquaculture context.

Uthicke, S. ; Choo, P.S. ; Conand, C. 2008.

**Observations of two Holothuria species (*H. theeli* and *H. portovallartensis*) from the Galapagos.** SPC Beche de Mer Information Bulletin 27:4.

Two little known species of Holothuria (*H. theeli* and *H. portovallartensis*) were observed in the Galapagos Islands.

Weirovski, F. ; Hall, S.J. 2008.

**Public-private partnerships for fisheries and aquaculture: getting started.** WorldFish Center Studies and Reviews 1875, 18 p. The WorldFish Center, Penang.

Public-private partnership (PPP) is becoming increasingly important for furthering development goals. But deciding when a PPP is suitable and what PPP arrangement is best is difficult. Many options exist for such partnership arrangements, and the differences among them can be subtle but significant. It is therefore important that researchers for development, managers, advisors and policymakers understand the language and concepts of PPPs. This document aims to improve understanding of PPP for those who would use PPP arrangements to improve fisheries and aquaculture in developing countries.

The WorldFish Center. 2008.

**Fisheries policies, support services and the institutional environment for trade.** WorldFish Center Issues Brief 1868, 7 p. The WorldFish Center, Penang.

Fisheries development depends on the policy and institutional environment comprising laws, administrative directives, institutions, services, infrastructure

support and incentives. This document reviews and evaluates national policies and fisheries development plans in nine Asian countries that are major fish producers, consumers and exporters. It also considers each country's institutions and support services for its fisheries sector.

The WorldFish Center. 2008.

**Food safety standards and regulations: implications for Asian fish exporters.** WorldFish Center Policy Brief 1801, 8 p. The WorldFish Center, Penang.

Over the years, the Codex system has developed various general and commodity-specific standards, guidelines, codes of practices and other recommendations to improve food safety. This brief outlines several key policy recommendations that can help Asian developing countries to comply with the HACCP standard as a process for managing food safety.

The WorldFish Center. 2008.

**Knowledgebase for lessons learned and best practices in the management of coral reefs.** WorldFish Center Flyer 1806, 2 p. The WorldFish Center, Penang.

The GEF Lessons Learned and Best Practices Toolkit (GEF LL Toolkit) provides information on how to design and implement coral reef management strategies. As our knowledge of the issues surrounding coral reef management and how best to approach them improves, revisions of this information can be anticipated.

The WorldFish Center. 2008.

**Lessons learned and best practices in the management of coral reefs.** WorldFish Center Lesson Learned 1804, 8 p. The WorldFish Center, Penang.

This brief presents a review of lessons learned and best practices in the management of coral reefs based on the analysis of 30 projects funded by the Global Environment Facility (GEF) related to coral reefs and associated tropical marine ecosystems and 26 non-GEF funded projects.

The WorldFish Center. 2008.

**Lessons learned and best practices in the management of coral reefs**

[Thai version]. Lesson learned; no. 1896; English version equivalent Lesson learned 1804, 8 p. The WorldFish Center, Penang.

This brief presents a review of lessons learned and best practices in the management of coral reefs based on the analysis of 30 projects funded by the Global Environment Facility (GEF) related to coral reefs and associated tropical marine ecosystems and 26 non-GEF funded projects.

The WorldFish Center. ReefBase Project. 2008.

**Knowledgebase for lessons learned and best practices in the management of coral reefs**

[Thai version]. Flyer; no. 1897; English equivalent: Flyer no. 1806, 2 p. The WorldFish Center, Penang.

The GEF Lessons Learned and Best Practices Toolkit (GEF LL Toolkit) provides information on how to design and implement coral reef management strategies. As our knowledge of the issues surrounding coral reef management and how best to approach them improves, revisions of this information can be anticipated.

The WorldFish Center. 2008.

**Planning the use of fish for food security in the Pacific.**

WorldFish Center Policy Brief 1865, 8 p. The WorldFish Center, Penang.

This brief gives a summary of the importance of fish as a food source in the Pacific. Forecasts of fish requirements in 2030 indicate that coastal fisheries will be able to meet demand in only a quarter of the island countries and territories surveyed. To ensure food security and meet minimum health requirements for fish, governments need to provide more local access to tuna and develop small-scale pond aquaculture. Diversifying fish sources will better enable rural households to cope with natural disasters, social and political instability, and climate change.

The WorldFish Center. 2008.

**Proceedings of a Workshop on the Development of a Genetic Improvement Program for African Catfish *Clarias gariepinus*.**

WorldFish Center Conference Proceedings 1889, 130 p. The WorldFish Center, Penang.

This proceedings include papers present at the workshop held from 5 to 9th Nov 2007 in Accra, Ghana. The areas cover 1)the present state of the catfish industry in Africa 2)Catfish reproductive management and grow out 3)Catfish nutrition and feeds

- 4)The application of genetic principles to catfish genetic improvement programs
- 5)Recommendations on how to best approach the issue of genetic improvement programs for catfish.

The WorldFish Center. 2008.

**Recommendation domains for pond aquaculture.** WorldFish Center Issues Brief 1894, 8 p. The WorldFish Center, Penang.

The contents of this brief are drawn from the results of the project “Determination of high-potential aquaculture development areas and impact in Africa and Asia. Recommendation domains for pond aquaculture is a suite of decision-support tools that use integrated mapping of the factors that affect aquaculture to help policy makers, planners, managers, researchers and extension workers.

The WorldFish Center. 2008.

**Reducing poverty and hunger through fisheries and aquaculture in Africa.** WorldFish Center Flyer 1895, The WorldFish Center, Penang.

This flyer highlights the role WorldFish can play with key partners in Africa to reduce hunger and poverty through small scale aquaculture.

The WorldFish Center. 2008.

**Reefbase Pacific information portal.** 1 p. The WorldFish Center, Penang.

A flyer to describe the ReefBase website which contains extensive information related to the status, use, management and knowledge of reef resources in the Pacific region both in English and French.

The WorldFish Center. 2008.

**Supply and demand issues affecting fisheries and aquaculture in the Philippines.** WorldFish Center Issues Brief 1849, 4 p. The WorldFish Center, Penang.

This revised brief is based on a 3 year project report of sustaining fisheries and aquaculture production of nine Asian countries. In this brief, issues relating to supply and demand of the Philippines fishery industry and aquaculture are outlined.

The WorldFish Center. 2008.

**Tropical river fisheries valuation: establishing economic value to guide policy.** WorldFish Center Issues Brief 1890, 16 p. The WorldFish Center, Penang.

This brief highlights the work of WorldFish on establishing new evaluation approaches to develop a global synthesis on the valuation of tropical river fisheries. The aim was to inform policy decision processes affecting inland fisheries with better appraisals of their value.

The WorldFish Center. 2008.

**Using fisheries and aquaculture to reduce poverty and hunger.** WorldFish Center Corporate Brochure 1893, 11 p. The WorldFish Center, Penang.

This brochure highlights the development challenges that WorldFish is addressing: expanding sustainable aquaculture and ensuring productive and resilient small scale fisheries

The WorldFish Center. 2008.

**Waves of change: lessons learned in rehabilitating coastal livelihoods and communities after disasters.** WorldFish Center Lessons Learned 1866, 4 p. The WorldFish Center, Penang.

This brief outlines the framework developed by WorldFish for rehabilitation of coastal livelihoods and communities after disasters. This framework can be applied after coastal disasters of any kind and will prove invaluable as climate change worsens the severity of storms in many coastal areas.

Yong-Sulem, S. ; Brummett, R.E. ; Tchoumboué, J. 2008.

**Hatchability of African catfish *Clarias gariepinus* eggs in hapas and in basins: a diagnostic study of frequent inhibition by rainfall and water stagnation.** Tropicicultura 26:39-42

To diagnose inhibition of egg hatchability by rainfall and water stagnation, some incubating eggs were protected against the physical impact of raindrops, some were subjected to various turbidity levels and others, to various incubation densities (number of eggs/litre of water) in flowing vs stagnant water. Data analyses showed that, unaffected by raindrop ( $P > 0.05$ ), hatchability was inversely proportional to

both turbidity (coefficient=-0.971) and incubation density (coefficient= -0.973). Only the properly constructed ponds (i.e. with elevated and compacted dykes) which do not receive any runoff should therefore be chosen for to hold incubation density to 480 eggs/litre or by partially renewing the incubation water on a daily basis. By so doing, some Cameroon smallholders have successfully engaged in regular on-farm reproduction of *Clarias gariepinus*.

## VIDEOS AND CDS

Neiland, A.E. ; Béné, C. (eds.)

**Tropical river fisheries valuation: background papers to a global synthesis.** WorldFish Center, Penang, Malaysia.

This CD contains papers of a compilation of five regional reviews that document the global status of tropical rivers and inland fisheries in three continents: Latin America, Africa and Asia. It explores the role of valuation methods and their contribution to policy making and river fishery management.

The WorldFish Center

**Fish farming supports HIV-affected families in Africa**

[1 min 34 secs.] <http://www.youtube.com/watch?v=XodkPRULvMU>

The food crisis is adding to the misery of countries already crippled by other burdens like drought and HIV. Here people are turning to fish farming, not only for food and income but also as a way to cope with the challenges of HIV — in particular the orphans from AIDS. This video takes a look at WorldFish's work to reduce poverty and hunger in Africa through fish farming.

The WorldFish Center

**Fish for life: rehabilitating lives after natural disasters**

[1 min 59 secs.] <http://www.youtube.com/watch?v=ALQX6KKay4A>

Coastal areas, whose inhabitants are often dependant on fish for food and income, are increasingly those most affected by natural disasters. This video takes a look at how one remote fishing community in Aceh Indonesia, which was totally destroyed following the 2004 tsunami, is benefiting from rehabilitation efforts by WorldFish that put the community at the heart of planning and implementing new options for their future.

The WorldFish Center

**How fishing farming is reducing poverty and hunger in Africa**

[CD-Postcard]

The WorldFish Center

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