

AQUANEWS

NEWSLETTER OF THE POND DYNAMICS/AQUACULTURE COLLABORATIVE RESEARCH SUPPORT PROGRAM

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1996-2001 Continuation Plan Gets Thumbs Up

The 1996 CRSP Extension Proposal Review Panel recommended to USAID that the Pond Dynamics/Aquaculture CRSP be granted a five-year extension. Specifically, the panel concluded its written review with the recommendation that "USAID extend this extremely productive CRSP for a five-year period as requested in the proposal."

USAID invited the PD/A CRSP to Washington, D.C. on 29 February to defend the program's 1996-2001 Continuation Plan. Bryan Duncan and Raul Piedrahita, Technical Committee Co-Chairs, Gary Jensen, External Evaluation Committee (EEP) member, and Brigitte Goetze, Deputy Director, represented the CRSP at the proposal defense. After a briefing by Harvey Hortik, Division Chief, Office of Agriculture and Food Security at USAID, Duncan summarized the CRSPs proposed research activities in a twenty-minute presentation. Jensen briefly presented the views of the EEP relating to CRSP strengths and challenges and demonstrated how the proposal addresses these points.

The review panel used a question and answer session to get more detail on some points of interest. Afterwards, they convened in private to discuss the Continuation Plan and summarize their findings in a report. That report highlighted program strengths which the panel found especially noteworthy and included recommendations on how to strengthen the proposal.

In addition to the PD/A CRSP, several other CRSPs are slated for

(Please see p. 3)


PD/A CRSP to Co-Sponsor 4th ISTA

The Fourth International Symposium for Tilapia in Aquaculture (ISTA) will be held 9-12 November 1997 in Orlando, Florida, and the CRSP will be a co-sponsor, along with the Israeli Aquafarmers Association, and the Mexican fisheries group SEPESCA. The American Tilapia Association and the International Centre for Living Aquatic Resources Management will be main sponsors of the three-day conference. Israel, Thailand, and Côte d'Ivoire were sites for ISTAs in 1983, 1987, 1991, respectively.

Hard on the heels of the CRSPs Annual Meeting and the World Aquaculture Society Meeting and Exposition in Bangkok, Thailand, CRSP Deputy Director Brigitte Goetze was in Arlington, Texas, to attend Aquaculture America '96 and the

Annual Meeting of the American Tilapia Association (ATA). There she met with ATA President Ray DeWandel and Vice-President Kevin Fitzsimmons as part of the CRSPs efforts to establish closer linkages with organizations involved in tilapia research and cultivation.

ATA is a non-profit organization with goals in education, member information and networking, government interactions, and support for research within the U.S. Recognizing that the fundamentals of tilapia culture have worldwide implications, the ATA is also interested in encouraging international participation.

Readers may want to check out the ATA's Internet homepage at: <http://ag.arizona.edu/azaqua/ata.html>. 

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DIRECTOR'S DESK

April 30th, 1996, was an important date for our CRSP. It was the date we had expected to receive authorization from USAID to embark on our five-year extension. It was also the date that many of our long-time participants had marked down for their retirement from the CRSP, and for new participants to join us. But the US government furlough this past winter and delays associated with the FY1996 federal budget turned the 30th of April into really just another day.

Fortunately for us, USAID Contracts came through at the last minute with authorization for a three-month extension for our program. This extension allows time for USAID to determine its internal FY1996 allocations, and to prepare the legal paperwork for our new grant. The intention is to have the new grant begin on August 1, 1996.

With new regulations for accountability, USAID and university contracts officers are requiring a more rigorous process for subcontracting, including the filing of animal use forms, human subjects forms, detailed budgets, and other certifications and assurances.

To ensure that collaboration is well thought out before projects begin, we, too, will be implementing a more detailed process to evaluate workplans and projects. Once the Technical Committee has signed off on the technical soundness of each workplan and project, Principal Investigators will be asked to prepare more detailed descriptions of intended benefits, and to identify beneficiaries and indicators for measuring impact. These descriptions will become part of the attachments for each subcontract.

The goal is to have as much information assembled beforehand, so as to be able to hit the ground running on specific projects as soon as the next grant is approved and we know our level of funding.



Ponder Writing to the CRSP . . .

You may notice a change in format in this issue of Aquanews. Marion McNamara, who edited the newsletter for many years, gracefully pawned (pardon the homonym...) this project off on me, a relative newcomer to the CRSP. Marion will be focusing on other projects.

As the new editor of Aquanews, I'm eager to hear your comments, controversial commentaries, constructive criticism, and, of course, compliments.

Send them to: Danielle Clair
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The PD/A Internet Web Site is:
<http://www.orst.edu/Dept/crsp/homepage.html>

Also, an apology to those who receive CRSP mailings: If you sent in a change of address or requested to be added or deleted from the CRSP mail list within the last six months, chances are that information was lost in a February "negative computer event." We regret this inconvenience and hope you won't mind repeating your instructions one more time, for the record.

This issue of Aquanews is dedicated to Mia.

CRSP Rwanda Refugee Relief Update

The Rwanda Refugee Relief effort is still operating though at a reduced level. Patricie Nyirahabinka (wife of Jean-Damascene Bucyanayandi) and her three children are still in Nairobi, where they have been waiting for visas to emigrate to Canada for almost 2 years. Patricie has the promise of a position at Sherbrooke University in Canada, where she and Jean-Damascene did their graduate work. Born in Canada, their middle son Jean-Fidele is a Canadian citizen. Patricie sent 6-year-old Jean-Fidele to Montreal last month to stay with friends and hopes to join him with her two other children as soon as possible. (*J-J Newman, Auburn University*)



(From p. 1)

Continuation Plan

extension in the near future. These include INTSORMIL, Peanuts, Soil Management, and Bean/Cowpea.

Previously, the Board for International Food and Agricultural Development (BIFAD) reviewed CRSP extension proposals. BIFAD, which was reconstituted in 1995, decided during its first 1995 meeting to no longer conduct CRSP extension proposal reviews. In response to this decision, USAID appointed a proposal review panel. ☐

1996 CRSP Extension Proposal Review Panel Members

Chair:

Anson Bertrand, Retired, Former Director of Science and Education, USDA and former Director of the Office of Food Security, USAID

Members:

Martin Billings, USAID/ENI/ED/AG

Melvin Blase, Professor, Agricultural Economics, University of Missouri

Meryl Broussard, Principal Aquaculture Scientist, USDA Cooperative State Research, Education and Extension Service, and President of the World Aquaculture Society

Dan Drga, USAID/LAC/RSD

Clarence Gray, Retired, Professor, Virginia Polytechnic and State University, Former Soil Scientist and Administrator, Rockefeller Foundation

Don Islieb, Director, International Programs, Michigan State University

Mort Neufville, Professor and Former Dean of Agriculture, University of Maryland, Eastern Shore

Mark Smith, USAID/ENI/ED/AG

Lamarr Trott, USAID/ENV/ENR

Rudy Vigil, USAID/AFR/SD/PSGE

CRSP Central Data Base Relocates to Oregon State University

An Interview with John Bolte

The PD/A CRSP Central Data Base is the largest standardized aquaculture data base in the world, housing data gleaned from all CRSP global and site-specific experiments. It has been housed at the University of Hawaii at Hilo since 1993 and managed by Kevin Hopkins. When Hopkins announced his resignation from the CRSP late last year, the Management Office issued a Request for Proposals (to CRSP participants) for taking over the management of the Central Data Base. Two proposals came forward. At the CRSP Annual Meeting in February, the Technical Committee voted in favor of the proposal submitted by John Bolte, Associate Professor in the Department of Bioresource Engineering at Oregon State University.

The following interview with Bolte took place in his office in Gilmore Hall, OSU, in late April.

What is physically involved in moving the Central Data Base? It is not a Univac, right?

It does not take up a room?

These are things that fit on disks. It is a pretty simple process – Kevin Hopkins and I have already started. The Central Data Base in Hawaii basically sat on a hard disk on a computer. Kevin sent me one stack of Bernoulli disks, which are 20 megabyte floppy disks, last week. This week we are going to try to get the datasets off them, make sure everything is there, and put it on our machines here.

The data will be housed on a network file server that is connected to the Internet, and is part of our network in the [Bioresource Engineering] Department, which is part of the larger campus network. We have lots of resources in terms of automating backups to those systems, and in providing a broad level of access. There is going to be some work in getting it so that it is



accessible on the Internet. But once it is there sitting on the hard disk, and there is an interface into it, it can live forever as long as we can maintain the capacity of the machine to support it.

Getting the data published on the Internet will increase the visibility of the PD/A CRSP as well as make the results of CRSP research more readily available. The first involves providing Internet linkages to the data via the Web, and providing appropriate security measures to monitor access and prevent misuse of the data. We have a couple of steps in mind beyond that, too...

(Please see p. 4)

John Bolte has conducted research and taught in the area of Biosystems Modeling and Analysis for the past 11 years. His research activities include developing mathematical models for warm and cool water aquaculture, agricultural crop production, climate change impacts on agriculture, and water and wastewater treatment systems. He received his Ph.D. in agricultural engineering from Auburn University, Alabama, in 1987.

Like applets?(See sidebar)

Applets. They will show up in a web browser. They will let you do queries on the data, generate plots and other types of synthesis of the data in a live sense so that you can get a quick understanding of relationships imbedded in those datasets, but also be selective in terms of understanding what you are seeing before you go through the process of downloading data. People with aquaculture backgrounds or non-aquaculture backgrounds will get the benefit of a lot of aquaculture experience that went into determining how these data ought to be presented.

How regularly do new data come in?

Basically they come in at the end of an experiment. The details depend on the particular experiments that are being done, within the context of the workplans. We require that essentially all experiments conducted under CRSP workplans submit results.

Do they need to be submitted in a standardized format? I was wondering about the workload, especially in terms of budgeting. Is that front-end work done by the Principal Investigators (PIs)?

PIs are responsible for initial data preparation and submission. The PD/A CRSP has historically tried to provide PIs with flexibility in submission formats, and we will continue to provide that flexibility. We have standardized procedures, and we will go through the datasets as they come in, consulting the PIs if irregularities are found. Once everyone is happy with the data, then they go into the Central Data Base.

Is there an interest in restricting access?

There are a several security issues we will be addressing through the Technical Committee (TC). Because data are subject to so much interpretation, we need to decide on what restrictions are appropriate. Options range from restricting access to CRSP personnel only, to providing complete, unmonitored access. I think we

“Applets” are either stand-alone programs which can be executed over the World Wide Web or they exist embedded in HTML (hyper text mark-up language) pages. Sun Microsystems’ language “Java” can be used to develop an applet – a cross-platform tool for providing executable content on the Web. In terms of the CRSP, an applet might allow the user to do cross-site comparisons, present summary datasets and corresponding statistics, or plot and graph particular datasets.

will end up somewhere in the middle, providing different levels of access for different users, and monitoring data access.

Is the question whether the quality of the data would be compromised by anybody being able to get at it?

No . . . really it is a question of wanting to have assurances that the data going out have had quality assurance (QA) procedures run on them, that is, that the PI who generated them has had a chance to look at them, and that they are in fact what was sent in. Once the PIs have signed off, my own feeling is that they ought to be available to anyone.

Would access be granted on a subscription basis?

That is something that still needs to be worked out; the TC needs to talk about it and reach consensus. We may propose that after data come in, we house them for a year, run our own QA procedures on them, make them available to the CRSP folks for a year to be able to use for publications. After a one-year period we might request the PIs to sign off, and we will let people download them at no cost but require that they fill out a form to get them so that we have a way of monitoring who has got the data.

Do you see the Central Data Base as read-only type material?

That is another thing we can provide flexibility on. My sense is that we want to make it available in a read-only mode for everybody, but the timing of that may vary. But it would also be nice to provide the PIs with the capability to edit data online, so that if they detect problems with them, they do not have to go

through us and can do it themselves. I think that is a more efficient process for everybody. I can very easily imagine a situation where PIs have write capabilities on their own data and everybody else has only read-only capabilities.

Who will make the decisions about these outstanding details?

The voting members of the TC will ultimately make those decisions based on recommendations from our group.

What are “metadata”?

Metadata are data about data. One of the concerns expressed about datasets is that there is information about the raw data that is not part of the raw data, things like changes to the experimental protocol that may have occurred, unusual weather conditions, unusual management conditions. These are things that do not manifest themselves in raw data but are important to have in terms of understanding the implications of the data.

So they are like footnotes...do they take the form of narratives?

They could be. They could be narratives attached to an entire dataset or they might be attached to specific records in the dataset. So there are different levels where metadata might come into play. The structure of the current Central Data Base does not support attaching metadata to the datasets. Something we will be looking at pretty quickly is expanding the Central Data Base to support metadata and developing reporting standards. So that as PIs go through the standard procedure for reporting raw datasets, there will be

similar standard procedures for reporting metadata. And that will be incorporated into the Central Data Base.

Are standards for metadata still being designed?

We are looking at other data bases – especially in environmental data assessment where metadata have been an issue for other people as well. There have been a number of approaches taken, and we will be taking a look at those before we make a recommendation to the TC. But my guess is that we will be able to build on what other people have done.

Are people involved in developing these data bases sharing information or is there an “us versus them” competition?

There are both, and you see that throughout the scientific community. In some cases people emphasize that sharing data, sharing knowledge is useful, in other cases they do not. My own philosophy is that we are in the business of providing these data in a more public forum. That is our responsibility as researchers using public dollars. I lean towards providing datasets as widely as possible, as long as the data are not mis-used and

misinterpreted, the sources of data are well documented, and we know who is using them.

Are there other aquaculture data bases that CRSP people and other readers would benefit by knowing about?

ICLARM has a data base called FishBase which they have been putting together for a number of years. CRSP datasets tend to focus on experimental datasets in pond dynamics, where FishBase really does not provide that level of information. But that is certainly one of interest. It is not on the Web at this point; they have talked about that. We may be interested in exploring where possible linkages with FishBase might be, and if we have technology that may be useful for them, I am certainly very supportive of that.

Also, we have just had some preliminary contacts with the Network of Aquaculture Centres in Asia-Pacific. My understanding is that they have just submitted some very extensive datasets with socio-economic type data and a focus on East Asia. They have expressed some interest in working with us to share standardized access procedures, so we are going to explore that.

The head of the Bioresource Engineering Department at OSU indicated that he would be willing to house the Central Data Base indefinitely, right?

Yes, that was one of the things we were certainly interested in seeing. The Central Data Base represents a summary of all the CRSP research that has gone on in the past.

What’s next ?

We will be getting the new Central Data Base manager on board in the next few weeks.

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Debut du Programme POND[©] en Français-or is that ETANG?

By June French speakers will have access to the PD/A CRSP POND[©] Decision Support System and user manual in their native language. The Oregon State University group that developed POND[©] received numerous requests for a French language version, primarily from researchers doing work in French-speaking regions in Africa.

Just as the original English version, the French language POND[©] will be available for downloading from the Internet. For those without Internet access, the program and user manual will be available in hard copy. To cover the cost of materials and shipping, the CRSP will charge US\$25 for mailing to U.S. domestic addresses and US\$50 for overseas mailing.

POND[©] is a computer program developed to guide decision making processes relevant to warmwater pond aquaculture. POND[©] was written to provide educators, extension agents, managers, planners, and researchers with a tool for rapidly analyzing aquaculture systems under different management regimes, and to assist in the development of optimal management strategies.

To order a copy of POND[©], in English or French, or for more information about the program generally, contact John Bolte, Biosystems Analysis Group, Dept. of Bioresource Engineering, Oregon State University. Phone 541-737-6303; Fax 541-737-2082; Email boltej@ccmail.orst.edu.

The POND[©] site Internet address is <http://biosys.bre.orst.edu/pond/pond.htm>.

February in Bangkok . . .

CRSP Shows Big at WAS 1996

The Pond Dynamics/Aquaculture CRSP was well represented at World Aquaculture '96, the annual conference and exposition of the World Aquaculture Society, held in Bangkok, Thailand, January 29 to February 29 this year. Our researchers and collaborators were involved in planning, providing technical advice and support, delivering oral and poster presentations, and acting as technical session moderators.

Kitjar Jaiyen, of the Thai Royal Department of Fisheries, was a member of the Organizing Committee. C. Kwei Lin and Claude Boyd chaired the 20-member Technical Program Committee, whose membership also included CRSP researchers and collaborators Peter Edwards, Gary Jensen, Raul Piedrahita, and David Teichert-Coddington.

Other CRSP participants whose work was presented included John Bolte, Claude Boyd, Supranee Chinabut, Konrad Dabrowski, James Diana, Peter Edwards, Carole Engle, Doug Ernst, Bart Green, Terry Hanson, Kevin Hopkins, Gary Jensen, Kwei Lin, David Little, Leonard Lovshin, Joseph Molnar, Shree Nath, Joyce (J-J) Newman, Raul Piedrahita, Tom Popma, Wayne Seim, Sunantar Setboonsarng, Jim Szyper, David Teichert-Coddington, Karen Veverica, Amaratne Yakupitayage, and Yang Yi.

Organizers estimated the total number of attendees at the conference and exposition to be near 4,000. The conference featured sessions on subjects ranging from the very technical to broad issues of socioeconomics and sustainability to practical questions relating to international aquacultural trade and safety regulations. ☞

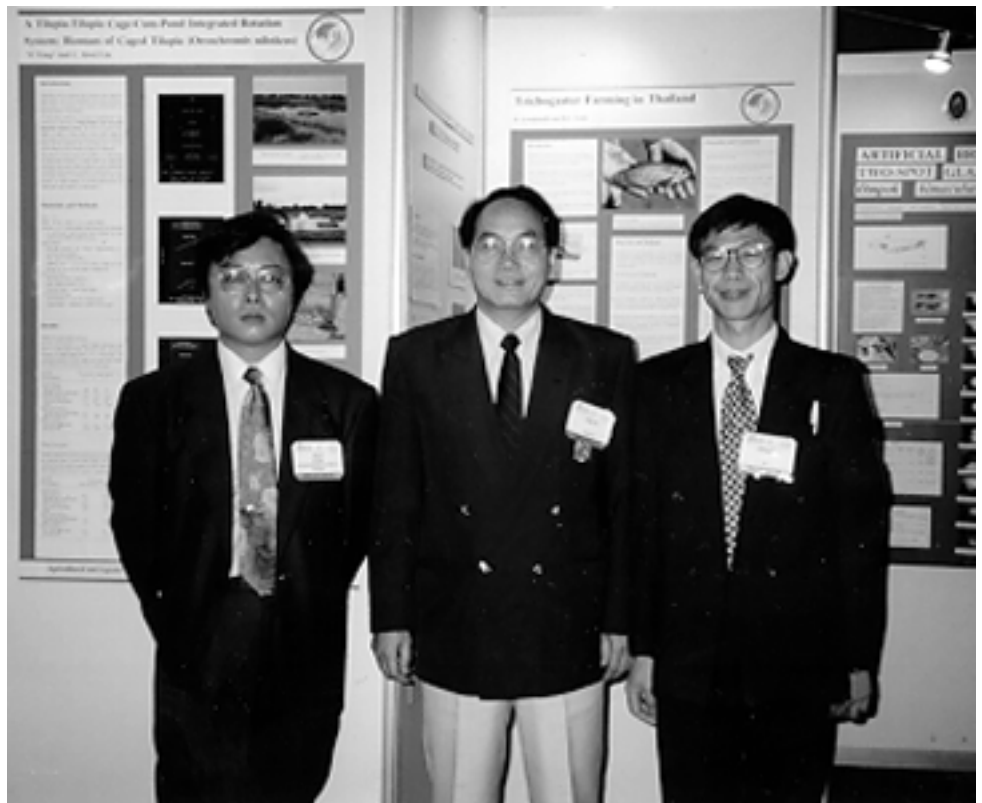
Kwei Lin and AIT: Kob kun mak ka ti tan rab rao yang ob un!

The staff of the PD/A CRSP Program Management Office want to offer our heartfelt thanks to Kwei Lin and to the Asian Institute of Technology for hosting this year's Annual Meeting. Anyone who has been responsible for organizing an event like this one knows the many details that must be planned for – not to mention the details that pop up seemingly from nowhere. The Ayutthaya site visit was especially interesting and offered in-the-water evidence of the applicability and success of CRSP research. Thanks also to all who attended for this year's productive exchange of ideas. ☞

It's a Small Aquaculture World

World Aquaculture '96 was jointly hosted by the Thai Royal Department of Fisheries, Chulabhorn Research Institute, and the Thailand Ministry of Commerce. Department of Fisheries Director General Dr. Plodprasop Suraswadi is himself a graduate of Oregon State University, having received his Master's of Science under Dr. Carl Bond in 1970. He went on to receive a Ph.D. from the University of Alberta, Canada.

Dr. Plodprasop is credited with identifying and implementing sustainable management techniques in the Thai shrimp industry that have helped avert some of the negative environmental impacts caused by shrimp farming in other regions. He has also helped secure U.S. technical assistance to design pumping stations to improve water quality in areas where shrimp farming occurs and is involved in restoration efforts for overharvested mangrove forest habitat. ☞



Kwei Lin and colleagues at WAS 1996, Queen Sirikit National Convention Center, Bangkok

The Aquaculture World According to Lester Brown

Lester Brown's work with the Worldwatch Institute is renowned for emphasizing sustainable development – a goal shared by the CRSP. We thought *Aquanews* readers might be interested in Brown's prognoses on aquaculture in the late twentieth century. The following excerpts are from recent releases. If any of them elicit a reaction, please share it with us. We'll print letters (subject to editing for space) in an upcoming issue of *Aquanews*.

Platt, A. E., 1995. Aquaculture Boosts Fish Catch. In: Lester R. Brown et al. (L. Starke, Editor). Vital Signs 1995: The Trends that are Shaping our Future. W.W. Norton & Co., NY., pp. 32-33.

"In the last 15 years, the fastest growing part of fish production has been in aquaculture (fish farming). This now accounts for 13.9 million tons of the global fish catch, with more than four fifths of it

coming from Asia. China had the largest increase in 1993 – 2.5 million tons – and most of that was from aquaculture.

"For many fish farmers, shrimp have become the latest cash crop. In 1992, India received \$425 million in World Bank loans for shrimp and fish farming. Aquaculture provides an alternative to the marine catch, but it has some high environmental costs, such as using large amounts of water and feed.

"The total marine catch has stagnated at 84 million tons, but levels of production have declined in many countries. The catch in the former Soviet Union dropped by 53 percent in five years, from 11.3 million tons in 1988 to 5.3 million in 1993. Japan, the Republic of Korea, and Chile all recorded declining production for 1993. Mexico lost 18 percent of its catch in four years. Peru, Thailand, and Vietnam, on the other hand, all registered increases in

total catch of at least 1 million tons in 1993. Peru's catch went up by 3.2 million tons between January and November 1994." (p. 32)

• • • • •
"The increasing number of conflicts between fishers and the growing demand for fish supplies guarantee economic devastation for those whose livelihoods and nutrition depend on fisheries. In June, delegates to the International Collective in Support of Fishworkers representing 30 countries met in the Philippines and called for a complete ban on bottom trawling in tropical waters, areas dominated by small-scale fishers.

"Only with effective long-term planning, short-term cutbacks, and a frank discussion of social and economic trade-offs will fisheries continue to be an important source of food and jobs into the twenty-first century." (p. 32)

(Please see p. 8)

ALCOM Meeting on Extension Service in Southern Africa

"Technical Consultation on Extension Methods for Smallholder Fish Farming in Southern Africa" was the title of a four-day conference held last November in Lilongwe, Malawi. Thirty-seven participants with extension service experience in eleven African nations met from 20-24 November to share information and techniques relating to aquaculture at the meeting sponsored by Aquaculture for Local Community Development (ALCOM).

During the first two days participants heard a variety of presentations. One of the speakers was Karen Veverica of the PD/A CRSP, who was invited to describe her extension service experience working as Team Leader/Training Advisor from 1983 through 1987 for the USAID-funded Rwanda National Fish Culture Project before joining the CRSP in 1987. She related how difficult it was to extend fish culture to farmers in a country with severe constraints—lack of inputs, land tenure problems, and traditional diets that did not include fish.

Still, Veverica was able to point to a four-fold increase in fish production and efficiency that resulted from the technical assistance offered by a well



Conferees on site visit to ponds in Chipata, Eastern Zambia


trained and enthusiastic group of extension agents. In concluding she offered suggestions about the steps that likely would have followed in the extension service program once fish culture techniques had been understood by farmers. Unfortunately, because of the political unrest in Rwanda, extension services were interrupted, and the transition planned for the aquaculture extension service did not take place. ALCOM will be publishing extended abstracts of the technical consultation presentations.

On the third day attendees split into three working groups to discuss: 1) Integration of aquaculture into agriculture extension services; 2) Delivery mechanisms, or the role and use of farmer-to-farmer and institutional extension mechanisms in aquaculture development; and 3) Aquaculture research and extension linkages. Each group was asked to develop a brief overview of the topic, state the central issues and problems, focusing on Southern Africa, and suggest priorities for action.

The fourth day of the conference included a field trip to visit farmers and ponds in Chipata, Eastern Zambia. On Friday, conferees met in plenary session to hear summaries of the working groups before adjourning around noon.

Countries represented at the conference were: Botswana, Kenya, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Tanzania, Zambia, and Zimbabwe.

In addition, representatives from the United Nations Food and Agriculture Organization/Rome, the International Center for Living Aquatic Resources Management/Malawi, the Southern African Coordination Conference/Inland Fisheries Coordinating Unit, and the Gesellschaft für Technische Zusammenarbeit also attended.

Readers may be interested in ALCOM's Internet home page:
<http://www.zamnet.zm/zamnet/alcom/alcom.htm>. 

Brown, L., 1996. The Acceleration of History. In: Lester R. Brown et al. (L. Starke, Editor). State of the World: A Worldwatch Institute Report on Progress Toward a Sustainable Society. W.W. Norton & Co., NY., pp. 1-20.

“Even as growth in the grain harvest is slowing, growth in the world fish catch has apparently ended. If the oceans cannot sustain a catch any greater than at present, all future growth in animal protein supplies can come only from land based sources, principally from feeding more grain. Whether feeding fish in ponds or cattle in feedlots, the pressure on supplies of grain, which dominates the human diet, will intensify further. In fish farming, it takes about 2 kilograms of grain to produce 1 kilogram of fish. Replacing the historical 2 million ton annual growth in the seafood catch (the average from 1950 to 1990) with fish from aquaculture would take 4 million tons of additional grain each year, roughly equivalent to the annual consumption in Belgium. If seafood consumers turn instead to poultry, the conversion rate is also roughly 2 kilograms of grain for each kilogram of poultry produced. With pork, it is closer to 4 to 1.” (pp. 8-9)

Bright, C., 1996. Understanding the Threat of Bioinvasions. In: Lester R. Brown et al. L. Starke (Editor). State of the World: A Worldwatch Institute Report on Progress Toward a Sustainable Society. W.W. Norton & Co., NY., pp. 95-113.

“Aquaculture is another exotic industry. Fish farming and the growing of other edible aquatic organisms – shellfish, lobsters, even seaweed – is an expanding component of world food production. The global aquaculture yield, both freshwater and marine, stood at around 12 million tons in 1990, and is expected to reach 22 million tons, or about one quarter of the total aquatic harvest, by 2000. In many developing countries, fish farming is already a major source of protein and is promoted aggressively by governments and international development agencies. Exotics – both exotic species and artificial strains of native species – are an important ingredient in this recipe. And in much of the Third World, fish are often just dumped into natural waters, as there are few containment facilities. Consequently, many standard aquaculture species are

Fishellaneous Items . . .

Tilapia Imports Continue to Grow

Tilapia imports are forecasted to further expand in 1996 as higher production of fillets allows tilapia to move into large food service markets. Domestic production is also forecasted to grow. Domestic producers will look to the live market first, but as output expands, larger producers will have to weigh the additional capital expenses and management needed to enter and compete in the processed fish market.

The American Tilapia Association estimated that U.S. production expanded in 1995 and will continue in 1996. Future growth in domestic production will depend on the ability of growers and processors to lower cost enough to compete with imports. If tilapia follows the same pattern as other finfish species, larger production and declining grower prices will expand the market. However, to appeal to a wider audience, especially in the U.S., processors likely will have to move to a larger variety of value-added products.

In the frozen fillet market, even with imported quantities declining, the value increased as the average import price was up 50 percent. The frozen fillet market is relatively evenly divided between Thailand, Indonesia, and Taiwan, each of which has a 26 to 30 percent market share.

Excerpted Aquaculture Outlook, March 7, 1996, World Aquacultural Outlook Board, supplement to the Livestock, Dairy, and Poultry Monthly Report.

already extremely widespread. The Mozambique tilapia, for example, is now established in nearly every tropical and subtropical country. In South and Central America, exotic species now dominate many freshwater fisheries.” (p. 105)

Brown, L. R., 1995. Environmental Alert Series: Who will feed China, A Wake-up Call for a Small Planet. W.W. Norton & Co., NY., pp. 163.

From Chapter 3, “Moving Up the Food Chain”:

“For China, it would be tempting to turn to the oceans for its animal protein as population pressure on the land intensifies, much as Japan did. As land became scarce there beginning a century ago, that country began relying on the oceans for its animal protein. The result was the fish and rice diet that now characterizes Japanese cuisine.” (p. 49)

• • • • •
“Future growth in demand for fish in China will have to be satisfied largely by fish farming. Faced with the need to cultivate its own fish supply, the nation has been producing some 6 million tons of fish (mostly carp) a year. This, in turn, increases the demand for grain by roughly 2 tons for each ton of fish produced, putting yet another demand on the country’s shrinking grain fields. Rising grain prices, combined with the need to use scarce land and water for fish farming, will constrain the growth in fish consumption.

“Since the agricultural reforms of 1978, China’s use of feed grains has increased steadily, approaching 80 million tons in 1994 – some 23 percent of total grain consumption. Its total use of feed grains now ranks second only to that of the United States. If incomes continue to rise in the years ahead, then feed grain use will also keep rising, absorbing an ever larger share of the world’s total grain supply.” (p. 50) ☐

Agriculture accounts for almost 16 percent of the U.S. gross domestic product and employs one out of every six Americans to produce raw food and fiber and to transform them into retail shelf items. Each U.S. farmer and rancher produces food and fiber for 129 people – 94 in the U.S. and 35 overseas. Productivity continues to climb. Since 1970, the farm and ranch population has declined from 9.7 to 4.6 million; today, the number of people fed and clothed by each producer has grown from 73 to 129 people. (*USDA, April 1996*)

125 Years of the National Marine Fisheries Service

NMFS, the oldest government conservation agency, celebrated 125 years of research, management, and conservation activities devoted to the nation's marine environment this spring. Originally founded in 1871 as the U.S. Commission of Fish and Fisheries, the agency's charge was to halt the decline of food-fish stocks after the New England nearshore fishery collapsed in 1870. At the time, marine science was in its infancy and nearly nothing was known about marine resources. By 1994, the agency had studied and assessed all of the nation's significant commercial and recreational marine stocks, and 70 percent of stocks overall. Organized with the Department of Commerce's National Oceanic and Atmospheric Administration, NMFS studies and develops marine resources, conservation and management of fish and marine mammals, aquaculture, seafood product safety, and public education. (*Environmental News Network, 1996*)

Taura! Taura! Taura!

Shrimp farmers may find relief from the devastating effects of Taura Syndrome by supplementing feed with a macrophage activator developed by ImmuDyne, Inc, a biotechnology firm based in Houston, Texas. In early studies conducted at Texas A&M University, shrimp fed ImmuStim', a non-specific macrophage activator that combats both viral and bacterial threats to crustaceans, had a 90 percent survival rate, compared to 35 percent of a control group fed regular feed. The firm is also working on macrophage products that may have applications to fish as well as to crustaceans. More information is available from ImmuDyne. Contact James Wood, Palo Alto, California, at 415-949-3864 or Durwood Dugger in Houston, Texas, at 407-489-6116. (*Fish Farmer, International File, Nov/Dec 1995 and Fish Farming News, March/Apr 1996*)

Free Brochure on U.S. Guidelines

Washington, D.C. – The U.S. Government Information Office is offering a no-charge brochure describing the *U.S. Federal Register* and *U.S. Code of Federal Regulations* and a booklet entitled *Guide to U.S. Government Information*. The *Register* carries the full text of proposed rules and regulations and agency contacts. The *Code* is updated annually and includes more than 200 volumes in 50 subject areas including aquatic life, foreign affairs and a number of other topics relevant to the work of the CRSP. To receive the **Federal Register Brochure**, fax your name and address to Promotion Manager, Superintendent of Documents Office, at 202-512-1656. The Internet web site of the Government Printing Office is: http://www.access.gpo.gov/su_docs/

Good Tasting Fish Raised on Cheap Stinky Feed

USDA report on research conducted at the National Center for Agricultural Utilization Research in Peoria, Illinois, indicates that corn by-products from ethanol production can be used to feed tilapia. The resulting feed is nearly 25 percent cheaper than commercial products. In trials researchers developed corn gluten meal and distiller's grain feeds, both supplemented with soya for a protein content of about one-third. Researchers continue to improve feed conversion rates and note that the flavor of fish fed the admittedly foul-smelling distiller's grain solubles did not suffer. (*Fish Farmer, International File, Nov/Dec 1995*)

Kudos for HACCP (That's Hazard Analysis Critical Control Point for the acronym-impaired)

About two years ago Solar Aquafarms, Inc, based in Sun City, California, voluntarily began using a HACCP-based inspection program approved by the US Department of Commerce. The company may be the only major American tilapia producer and processor that sells up to 25 percent of an annual 4 million pounds of tilapia as fillets. Most buyers of processed fish, such as large supermarket chains, have inspectors on staff, but knowing that a processor follows detailed and documented internal quality control standards establishes consumer confidence that a processor is supplying a fresh product that has been maintained in sanitary conditions and at proper temperatures. (*Fish Farming News, Jan/Feb 1996*)

Upcoming Conferences and Meetings

Date	Topic/Title	Event Location	Contact Information
May 8-10	Conf on Marine Aquaculture	Portland, Maine, USA	R Barnaby, 113 North Rd, Brentwood NH 03833-6623; Tel 603 679 5616; Fax 603 679 8070; Email: rollie.barnaby@unh.edu
May 14-17	2nd Intl Conf on Culture of Penaeid Prawns & Shrimps	Iloilo City, Philippines	Conf Secretariat, SEAFDEC Aquaculture Dept, PO Box 256, Iloilo City 5000, Philippines; Tel 63 33 27 1009; Fax 63 33 27 1008
May 15-19	Mtg of Natl Assn of State Aquaculture Coordinators	Little Rock, Arkansas, USA	Ted McNulty or Joyce Hutchinson; Tel 501 682 5849 or 501 682 5998
May 19-24	Intl Conf on Fish Inspection & Quality Control	Arlington, Virginia, USA	National Fisheries Institute, 1525 Wilson Blvd, Ste 500, Arlington VA 22209; Tel 703 524 8883
June 7-10	Fisch '96 (Globefish/FAO)	Bremen, Germany	MGH Bremen GMBH Bischofsnadel 1-2, 28195 Bremen, Germany; Tel 49 421 36 30 5 21; Fax 49 421 32 14 85
June 12-14	Tokyo International Seafood Show	Tokyo, Harumi, Japan	Matthew Meredith, OES Ltd, 11 Manchester Sq, London W1M 5AB; Fax 44 171 486 8773
June 20-22	9th Annual Atlantic Aquaculture Expo & Conf	New Brunswick, Canada	AAF, PO Box 89, St Andrews, NB, Canada E0G 2X0; Tel 506 658 0018; Fax 506 658 0750; Email aquafair@nbnet.nb.ca
July 1-4	Fish/Econ & Trade 8th Biennial Conf	Marrakesh, Morocco	Conf Secretariat, BP 12518, Casablanca, Morocco; Tel 212 2 99 32 40; Fax 212 2 98 17 24
July 19-21	Successes & Failures of Commercial Recirc Aquaculture	Roanoke, Virginia, USA	Conf Registrar, Continuing Ed/VA Tech, Mail Code 0104, Blacksburg VA 24061; Tel 540 235182
July 28 - Aug 2	2nd World Fisheries Congress	Brisbane, Queensland, Australia	Intermedia Convention & Event Mgmt, PO Box 1280, Milton, QLD 4064 Australia; Tel 617 3369 0477; Fax 617 3369 1512
Aug 11-15	VII Intl Symposium on Nutrition & Feeding of Fish	College Station, Texas, USA	Dept of Wildlife & Fisheries Sci, Texas A&M Univ, College Station TX 77843; Tel 409 845 5777; Fax 409 845 4096
Aug 25-29	126th Mtg of American Fisheries Society	Dearborn, Michigan, USA	Mary Fabrizio, Natl Bio Service, 1451 Green Rd, Ann Arbor MI 48105; Tel 313 994 3331; Fax 313 994 8780; Email: fabrizio@greatlakes.net
Sept 1-5	Intl Conf on Eastern Europe, European Aquaculture Soc	Budapest, Hungary	European Aquaculture Society, Coupure Rechts 168, B-9000 Gent, Belgium; Fax 32 9 2237604
Sept 25-27 Sept 26-28	Infofish-Aquatech '96 Aquaculture Asia '96 Exhibition	Kuala Lumpur, Malaysia	Clare Northcott, EMAP Heighway, MEED House, 21 John St, London WC1N England; Tel 44 0 171 404 5513; Fax 44 0 831 9362
Oct 1-3	Scottish Fish Farming Conf & Exhibition	Aviemore, Scotland	Peter Landless, 3a Querns Lane, Cirencester GL7 1RL, England; Fax 44 1285 650729
Oct 13-15	Marketing & Shipping Live Aquatic Products '96	Seattle, Washington, USA	John Peters, Nor'Westerly Food Tech Services, 2743 56th Ave SW, Seattle WA 98116; Tel 206 938 0676; Fax 206 933 7937; Email: 103243.675 @compuserve.com
Oct 29- Nov 1	'96 China Fisheries & Seafood Expo	Qingdao, China	Sea Fare Expositions, Inc, 5305 Shilshole Ave NW, Ste 200, Seattle WA 98107; Tel 206 789 6506; Fax 206 789 9193; Email 102154.2623 @compuserve.com
Nov 14-16	Victam-Asia '96 & VIV Aquaculture '96	Bangkok, Thailand	Piet Schrama, Victam Intl, PO Box 1103, 2302 BC Leiden, The Netherlands; Tel 31 71 576 8603; Fax 31 71 531 7554
Nov 27-30	ExpoPesca '96	Santiago, Chile	EMAP Heighway, 21 John St, London WC1N England; Fax 44 0 171 831 9362
Feb 20-23, 1997	World Aquaculture Society, 1997 Annual Conf and Expo	Seattle, Wash, USA	WAS '97 Conference Manager, 21710 7th Place West, Bothell, WA 98821; Tel 206-485-6682; Fax 206 483 6319
Oct 5-11, 1997	3rd Intl Abalone Symposium	Monterey, California, USA	Catherine Ashley, California Sea Grant College, 9500 Gilman Dr, La Jolla CA 92093-0232; Fax 619 534 2231; Email: cashley@ucsd.edu

Workshops and Short Courses

Date	Title/Topic	Place
Year-round	Work Experience in Hatcheries Techniques	AIT
Year-round	Training & Research in Fisheries & Stock Mgmt	WAU
May 19-23	Applied Environmental Statistics	BSU
May 27-June 14	Sustainable Aquatic Systems: Fish Farming for the Future	AIT
June 3-14	Diseases of Warmwater Fish, 2-week course	UF
June 20-22	1st Intl Course on Tilapia Production	Univ/Mex
Jul 1-26	Nile Tilapia: Techniques for Mass Fry Production & Grow-Out	AIT
Aug 5-23	Pond Water Quality Mgmt for Commercial Fish & Shrimp Prod	AIT
Aug 6-9	Fish as Research Animals	CAI
Aug 10-12	Basic Disease Diagnostics in Finfish Aquaculture	CAI
Aug 12-14	Bacterial Diagnostics in Finfish and Shellfish Aquaculture	CAI
Aug 12-23	Study Tour: Aquaculture in Thailand	AIT
Oct 7-9	Prescription of Aquaculture Therapeutants	CAI
Oct 10-12	Applied Aquaculture Epidemiology	CAI

Place	Institution and Contact Information
AIT	Aquaculture Short Course Unit, Ag & Aquatic Systems, School of Env, Resources & Development, Asian Inst of Technology, GPO Box 2754, Bangkok 10501 Thailand; Fax 66 2 524 5484; Email: somchai@ait.ac.th
WAU	G. van Eck, Dept of Fish Culture & Fisheries, Wageningen Agricultural Univ, PO Box 338, 6700 AH Wageningen, The Netherlands; Tel 31 8370 8330; Fax 31 8370 83937; Email: gerrie.va.eck@alg.venv.wau.nl
BSU	Nancy Ness, Boise State University, 1910 University Dr, Boise Idaho 83725 USA; Tel 208 385 1689; Email aceness@bsu.idbsu.edu
UF	Ruth Francis-Floyd, Dept of Fisheries & Aquatic Sci, Univ of FL, 7922 NW 71st St, Gainesville Florida 32653 USA; Tel 904 392 9617 x229; Fax 904 846 1088
Univ of Mexico	Carmen Carbonell De R, Facultad de Medicina Veterinaria y Zootecnica, Apartado Postal 21-085, CP 84510, Coyoacan, Mexico, DF; Tel 6 22-58-49; Fax 622-58-51; Email: carmencc@servidor.unam.mx
CAI	Bob Johnston, Canadian Aquaculture Inst, 550 Univ Ave, Charlottetown, Prince Edward Island, Canada C1A 4P3; Tel 902 628 4226; Fax 902 566 0420; Email bojohnston@upei.ca

"Hapa" - nings*

- **Robert Fridley**, retired, University of California, Davis, College of Agricultural and Environmental Sciences, stepped down from the CRSP Board of Directors in last December, but also graciously offered to continue serving for up to one year while a replacement is sought. The Program Management Office staff thank him for his years of prudent guidance and advice and gratefully accept his offer of continued service on the Board.
- The External Review Panel assembled by USAID recommended approval of the **PD/A CRSP 1996-2001 Continuation Plan**. Of course, decisions relating to funding allocations for USAID were not made when they were expected because of the 1996 federal budget impasse. As a consequence USAID appropriations to individual CRSPs for new grants will likely not occur until later this summer. In the interim, the PD/A CRSP was granted an extension to continue working on current projects.
- After 7 years of service on the CRSP Board of Directors, **Oneal Smitherman** elected to retire from the Board effective April 30. He retired from Auburn University in the fall of 1994. Smitherman was one of the original founders of the CRSP, having been involved in early planning efforts in the late 1970s. We extend many thanks to him for his dedication to the program and wish him well in his future endeavors.

* A hapa is a net enclosure within a pond . . .



Tilapia for sale at the outdoor market in Sukhothai, Thailand

Publications available for the asking . . .

Send requests for the following publications to D. Clair at the address shown on p. 2.

PD/A CRSP List of Publications and Publications Order Form.

Quarterly Report October - December 1995.

Egna, H., B. Goetze, M. Mcnamara, B. Herbison, and D. Clair, 1996. Thirteenth Annual Administrative Report. Oregon State University, pp. 96.

Green, B.W., Z. El Nagdy, H. Hebicha, I. Shaker, D.A. Kenawy, and A.R. El Gamal. 1995. Evaluation of Nile tilapia production systems in Egypt. CRSP Research Report No. 95-91.

Lin, C.K. 1996. Clarias and tilapia interation in polyculture. CRSP Research Report No. 96-94.

Molnar, J.J., T.R.Hanson, L.L.Lovshin. 1996 Social, Economic, and Institu-

tional Impacts of Aquacultural Research on Tilapia: The PD/A CRSP in Rwanda, Honduras, the Philippines, and Thailand. Auburn University, pp.72.

Complete copies of the papers listed below can be obtained by contacting the authors directly – abstracts are available from the CRSP/OSU office.

Green, B.W., and C.E. Boyd. 1995. Water budgets for fish ponds in the dry tropics. *Aquacultural Engineering* 14(4): 347-356. (Abstract: CRSP Research Report No. 96-87.)

Green, B.W., and C.E. Boyd. 1995. Chemical budgets for organically fertilized fish ponds in the dry tropics. *Journal of*

the World Aquaculture Society 26(3):284-296. (Abstract: CRSP Research Report No. 96-88.)

Lin, C.K. 1995. Co-culture of catfish (*Clarias macrocephalus* x *C. gariepinus*) and tilapia (*Oreochromis niloticus*) in ponds. *Aquatic Living Resources* 8(4):449-454. (Abstract: CRSP Research Report No. 96-93.)

Teichert-Coddington, D.R. and R. Rodriguez. 1995. Semi-intensive commercial grow-out of *Panaeus vannamei* feed diets containing differing levels of crude protein during wet and dry seasons in Honduras. *Journal of the World Aquaculture Society* 26(1): 72-79. (Abstract: CRSP Research Report No. 96-89.)

World Aquaculture Society 1997 Conference & Exposition

WAS '97, "Linking Science to Sustainable Industry Development," is calling for poster and oral presentations for its February 20-23, 1997, meeting to be held in Seattle, Washington. Abstracts are due on July 31, 1996. Conference planners encourage poster submissions over those intended for oral presentation. The focus will be on farm management, production systems, international policy and development, and on the

role of science and technology in the future global development of sustainable aquaculture.

The WAS conference is a major international aquaculture event, bringing together technical, producer, and supplier segments of the aquaculture industry. Topics will include sessions on computer technology, economics, education/extension, effluents, farm production, feeds/nutrition, polyculture and others.

Fax 206-483-6319 to receive information about the conference and instructions for contributing papers – include name, company/affiliations, address, city/state/zip, and phone/fax numbers.

Tentative future WAS meetings include: 1998 – Las Vegas, Nevada; 1999 – Tampa/St. Petersburg, Florida; 2000 – Southeast or Mid-Atlantic location; 2001 – Orlando, Florida. ☐

AQUANEWS

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