



Culture-based fisheries development in Lao PDR and Cambodia proceeding well

Under the ACIAR-funded project *Culture-based fisheries development in Lao PDR and Cambodia*, a monitoring team recently visited both countries to observe progress by participating community groups and to provide guidance for the next stocking season. The project is working with rural villages to implement culture-based fisheries as a community activity, where the work, management and benefits are shared by local residents.

Cambodia

The monitoring team travelled to Oddar Meanchey and Preah Vihea provinces to meet with communities at the trial sites. The team assessed activities to be undertaken in the upcoming stocking cycle, in particular the stocking and harvesting plans and strategies to increase community awareness to optimise the returns from culture-based fisheries activities.

The team was comprised of Prof. Sena De Silva, Lead Consultant; Dr. C.V. Mohan, R&D Manager, NACA; Srun Lim Song, Country Project Leader; representatives of the Research Team, Hort Sitha, Ou Sary, Ouch Vutha; and representatives from the provincial fishery authorities Hunong Dalya (Kampong Thom Province), Pen Verna (Preah Vihea Province) and Heng Sen (Oddar Meanchey Province).

It was evident in all reservoirs visited by the team that culture-based fisheries activities being undertaken by the communities were contributing directly to food and nutritional requirements of the local people. Harvested fish were not being sold or marketed. Rather, whenever a household's



Culture-based fisheries are being undertaken as a community activity.

catch exceeded its daily needs the excess was preserved for future use by processing it into a paste or sauce for future consumption.

The highlight of the visit was the team's participation in two community meetings, held in Oddar Meanchey and Preah Vihea on 25 and 27 September, respectively. The meetings were well received, with some people travelled more than 100 km (three hours by motorbike) to attend. Ideas and concerns were freely shared and new strategies for increasing the returns from the culture-based fisheries activity were discussed. There was consensus that species such as silver barb, catfish and others that could reproduce in the reservoir environment added benefit to production, a request to increase the numbers stocked. The communities also suggested that giant freshwater prawn (*Macrobrachium rosenbergii*) be included in the stocking programme.

The meetings discussed ways to improve the survival rate of the seed stock delivered to each site. As Cambodian law allows open access to reservoir fisheries there is no mechanism to prevent households fishing, even immediately after stocking. Accordingly, a suggestion by Prof. De Silva to enhance the returns on stocked fish by increasing the conservation area in each reservoir and netting it off to confine the stock for four to five months, allowing a greater proportion of the stocked seed to grow near capacity, was accepted by the stakeholders. The suggestion also included that one or two days of community fishing immediately after removal of the net would allow the whole catch to be marketed with some of the proceeds used for purchasing seed stock for the next



Juvenile tilapia.

cycle. The community representatives agreed to implement these strategies during the next crop, and it is believed that these changes in the practice will significantly increase the return from stocking.

Illegal fishing, in particular the use of prohibited gear such as electro-fishing, was also a common concern amongst most communities, the situation being exacerbated by the fact that military personnel also engage in such activities, making it difficult to stop. However, the Project Leader undertook to consult local authorities to request their assistance in reducing illegal fishing.

There was general agreement that inter-community and inter-provincial exchanges will be useful for encouraging exchange ideas and bringing about an overall improvement in culture-based fisheries activities.

Lao PDR

The project activities in Lao PDR, where culture-based fisheries is at a more advanced stage, having been introduced under a previous ACIAR project, is trialling the establishment of Communication Centres to support community culture-based fisheries activities. Eight centres have been established to date at sites accessible to farmers, covering the communities that have been drawn into the project since 2011. The centres are located at:

- Department of Agriculture & Forestry Office, Saythani District, Vientiane Capital.
- Provincial Livestock & Fisheries Section, Vientiane Capital.
- Namxuang Aquaculture Development Centre, Vientiane Capital.
- Department of Agriculture & Forestry, Pakasan District, Boirikhamxay Province.
- Boirikhamxay Provincial Livestock & Fisheries Office.
- Lao – Singapore Hatchery.
- Nam Ngum Fisheries Management Centre.
- Pa Bo Hatchery, Savannakhet Province.

In general farmer inquiries are brought to the attention of the relevant communication centres by village leaders, who are the main contact point between the regional/ provincial authorities and partners. To date, on average in for example, Saythani District, all five reservoir heads visit the communication centre once per week and place their inquiries. Based on the nature of the inquiry the communication centre staff may visit the community obtain “on ground” information and provide first line extension support. Where specialist intervention is required the staff will forward the inquiry to the Head Office of the Department of Livestock and Fisheries for advice. Most of the enquiries to date have been regarding technical issues concerning seed procurement, health management and predator control.

The initial plan for linking the Communication Centres was to make use of Skype to support voice and video interaction over wireless 3G data connections. However, 3G coverage



proved to be inadequate for Skype in nearly all rural sites and so the centres now make use of instant messaging services (preferred) and email, which can operate over low-speed connections. The Department of Livestock and Fisheries also plans to establish a Facebook group to enable project participants to interact and share photographs (important for health, environmental concerns) online. However, as Facebook is still relatively unknown to people outside the capital they plan to hold a training course to introduce to project participants in November.

Communities have requested the setting up of centres at each culture-based fisheries site. As this will require considerable training and support, the most capable communities will be piloted first; a process which is expected to be extended gradually through more communities throughout the course of 2014. The proposed target is about two communities per district, including communities involved in the Van Vien and Tulakhom Districts.

The Lao project team, in collaboration with Australian project personnel, has developed a manual on artificial propagation for culture of silver barb (pa phia) whilst a manual for better management practices drafted by Prof. De Silva, is being further scrutinised by the Lao team. The pa phia manual is presently being translated into Lao and will be published together with “farmer friendly” versions by the end of 2013.

An exchange visit of a Laotian farmer group to Cambodia will be held in April - May 2014. A regional workshop will also be held to discuss the outcomes of the project in Siem Reap in October 2014 (dates to be advised).

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National aquatic animal disease surveillance programme launched in India

The Department of Animal Husbandry Dairying and Fisheries (DAHDF), Ministry of Agriculture, Government of India has approved a national project on aquatic animal disease surveillance for five years and funding of INR 320 million (about US\$ 6 million) has been allocated through the National Fisheries Development Board (NFDB). A national consultation on aquatic animal disease surveillance held last April 2012, attended by NACA, made a strong recommendation for the need for a national program on surveillance. This was followed up by the development of a project proposal by the National Bureau of Fish Genetic Resources (NBGR) in consultation with national partners and NACA. The project was presented to the Ministry and was formally approved in February 2013 and the NBGR was chosen as the nodal coordinating agency.

The national surveillance program will be undertaken by 21 leading national institutions in close collaboration with respective state fisheries departments covering fourteen key Indian states with passive and active surveillance in more than 100 districts. Shrimp, carp, catfish, tilapia, ornamentals, cold water species, freshwater prawn, and molluscs will be covered. During the first 6-12 months of the project, the focus will be on collection of baseline information and passive surveillance from the selected districts of fourteen states. The project will gradually evolve to include active targeted surveillance based on the requirements and purpose.

At the national level a Technical Advisory Committee (TAC) has been constituted to oversee the implementation of the project and NACA is included as one of the special invitees for TAC meetings. At the project implementation level, NBGR has constituted a core scientific committee (CSC) to assist NBGR in running the project and NACA has been included as one of the members of this core scientific committee.

A one day pre-launch consultative meeting was held on 27th May 2013. This event was attended by 41 delegates representing 21 leading national institutions of ICAR (CIBA, CIFA, CIFE, CICFRI, NBFGR, CMFRI, DCFR) and Fisheries colleges of State Agricultural Universities (Mangalore, Tuticorin, Kerala, Andhra Pradesh, Tripura, Assam, West Bengal, Srinagar, Ratnagiri, Verawal, Orissa). The delegates were the designated PIs or Co-PIs of the national project. Welcome remarks were provided by Dr Jena, Director of NBFGR. Introductory remarks on surveillance and implementation mechanisms were provided by Dr CV Mohan of NACA. The Executive Director of NFDB provided remarks on the need to consider environmental issues in the national surveillance work. Dr Gajendragad from PD-ADMAS provided brief insight into surveillance in livestock sector in India and the importance of national database. Formal opening session was followed by a detailed presentation by the Director of NBFGR on the project, proposed activities, role of partner institutions, expected outputs, allocation of budget, logistics and administrative matters. This was followed by presentations from 21 institutions covering the following topics:

- State, district and ecosystem to be covered for surveillance by the institution.
- Background on aquaculture in the identified state.
- Species to be covered.
- Diseases to be covered.
- Extent of surveillance (passive / active) to be carried out.
- Capacity of the institution.
- Linkages with the respective state fisheries departments.



Participants in the launch workshop.

- Budget requirements.
- Other issues of relevance to the national program.

Formal launch workshop of the project was held on 28 May 2013. Key dignitaries included Dr Ayyappan (Director General of ICAR and Secretary of DARE), Dr Meena Kumari (Deputy Director General of Fisheries, ICAR and NACA Governing Council Member), Dr Vishnu Bhat (FDC, DAHDF), Dr Madhumitha Mukherjee (Executive Director, NFDB), Dr Jena (Director, NBFGR) and Dr CV Mohan from NACA. This launching event was attended by 41 delegates representing 21 leading national institutions of ICAR and Fisheries colleges of State Agricultural Universities.

Dr Jena provided the welcome address. Under the Guest of Honour, Dr CV Mohan from NACA provided a speech on importance of national surveillance for disease management, compliance to WTO SPS, enhancing credibility of the nation among trading partners and stressed the fact that surveillance is the basis for all disease management strategies. Dr Mukherjee of NFDB highlighted the various programs of NFDB and their support to state fisheries departments for health management. She urged the project to work closely with the state fisheries departments. Dr Vishnu Bhat, Fisheries Development Commissioner from the DAHDF explained how the project came about, and stressed the need to consider mechanisms to sustain the program after five years by the respective state fisheries departments. He also appreciated the role of NACA in supporting the national surveillance initiative from the very early stages of project conceptualization. Dr Meena Kumari expressed her happiness that the project has finally come through and now the country has a program to support national surveillance. She called upon all the ICAR and SAU institutions to ensure commitment to the project. Dr Ayyappan in his address expressed happiness and thanked NBFGR and NACA for pursuing the concept and finally getting the project approved. He also thanked the Joint Secretary of DAHDF for his sincere efforts in supporting approval of this project and funding through NFDB. Dr Ayyappan elaborated on the importance of national surveillance, need for building our credibility amongst trading partners, lessons we can take from the livestock sector in India, lessons we can draw upon from Asia Pacific, and the need for strong commitment from all the national institutions. NACA's role in regional aquatic animal health management was appreciated and NACA was asked to continue to assist the project by provision of technical assistance and in supporting capacity building activities.

A national training workshop on the national surveillance program for aquatic animal diseases was held at the National Bureau of Fish Genetic Resources, Lucknow, India, 17-20 September 2013.

The workshop was attended by 46 delegates representing 21 leading institutions of the Indian Council for Agricultural Research, namely CIBA, CIFA, CIFE, CICFRI, NBFGR, CMFRI, DCFR; the fisheries colleges of the state agricultural universities of Mangalore, Tuticorin, Kerala, Andhra Pradesh, Tripura, Assam, West Bengal, Srinagar, Ratnagiri, Verawal and Orissa.

The work commenced with a formal opening ceremony with the lighting of the lamp. Welcome remarks were provided by Dr Jena, Director of NBFGR. Remarks were also delivered by Prof. Kenton Morgan (University of Liverpool), Dr Jiraporn (Thailand Department of Fisheries). Dr Vishnu Bhat, FDC, provided presidential remarks and Dr P. Ponnia provided the vote of thanks.

Lectures provided by the technical experts covered concepts and principles of surveillance, the role of epidemiology, sampling issues, risk analysis, and experiences from Thailand and from the Indian livestock sector.

The highlight of the workshop were group planning exercises to develop comprehensive, cost-effective surveillance systems for different scenarios using abstract models concerning to avoid introducing species-specific or geographic biases. Over the four days the scenarios became progressively more interesting and complicated. Participants presented and discussed their solutions.

The feedback from participants was very encouraging. For most of them the workshop was a new learning experience and they appreciated the scenario solving exercise through which they learnt the concepts and principles of surveillance. The contribution of Prof. Kenton Morgan and Dr Jiraporn was highly appreciated by all concerned.

The networking and collaboration resulting from this project would be of significant value for aquatic animal health management in the country. Through the implementation of this project, the national surveillance team will be able to respond to disease emergencies and also provide scientific information to the national Competent Authority for taking informed policy and trade related decisions.

Report on early mortality syndrome / acute hepatopancreatic necrosis syndrome of shrimp

A new FAO Fisheries and Aquaculture Report, *Early Mortality Syndrome (EMS) or Acute Hepatopancreatic Necrosis Syndrome (AHPNS) of Cultured Shrimp*, focuses on this emerging disease that has devastated the shrimp industry of China, Malaysia, Thailand and Viet Nam over the last three years.

FAO project TCP/VIE/3304 "Emergency assistance to control the spread of an unknown disease affecting shrimps in Viet Nam", implemented by Viet Nam's Ministry of Agriculture and Rural Development, organized an FAO/MARD Technical Workshop on EMS/AHPNS last June.

Sixty-three participating international experts and local stakeholders from the shrimp farming sector discussed the outcomes of the work carried out under the TCP project and the current state of knowledge on EMS/AHPNS in the affected countries. The Workshop agreed on a list of specific

and generic actions and measures that may help reduce and manage the risks of EMS/AHPNS, directed to various shrimp stakeholders (public and private sectors).

The report is available for free download from FAO at: <http://www.fao.org/docrep/018/i3422e/i3422e.pdf>

International Symposium on Small-scale Freshwater Aquaculture Extension, 2-5 December, Bangkok

World population is projected to increase drastically in the coming decades, threatening the food and nutritional security of the masses and particularly of the poor. Greater attention on agricultural resource management is essential. Among the different sources of animal protein, freshwater fish are considered to be one of the most promising commodities that can contribute significantly to food security and nutrition. Moreover, small-scale aquaculture, common in the Asia-Pacific region, provides additional benefits to rural communities including income generation, nutritional improvement, and sustainable practices through integrated farming systems.

The Japan International Cooperation Agency (JICA) has been involved in the development of small-scale aquaculture through technical cooperation projects (TCPs) in Southeast Asia and Sub-Saharan Africa, which demonstrate the effectiveness of "farmer-to-farmer extension" approaches in rural aquaculture. In these TCPs, core farmers who produce fingerlings are motivated to teach grow-out to others using simple techniques so that they can acquire patronage of clients and expand market outlets. It is noteworthy that such system not only provide economic benefit to the core farmers but also enhance their social role as local leaders and/or extension workers. This approach is not totally new, especially in the agriculture sector. However, the experiences, lessons learned and findings from these JICA-implemented TCPs on small-scale aquaculture are worth sharing with other stakeholders, and as a reference for better management practices.

In this context, an international symposium is being organised for stakeholders involved in the JICA-assisted projects in Cambodia, Lao PDR, Myanmar, Benin and Madagascar. This symposium, which will be held in the Centara Grand Hotel Ladprao (Bangkok) is also open to other interested stakeholders in the region who are involved in small-scale aquaculture operations. JICA, NACA and DOF-Thailand are co-organising this symposium, with support from key partner institutions including the FAO Regional Office for Asia and the Pacific, SEAFDEC, the Asian Institute of Technology and the Thailand International Development Cooperation Agency. Presentations as well as discussions during the symposium will be summarised in the form of proceedings for distribution to relevant organisations.

The main objective of the symposium is to provide a venue for information sharing on extension of small-scale aquaculture, specifically targeted to those individuals and relevant organisations involved in various aquaculture development projects. The symposium will also assess and present the effectiveness of "farmer-to-farmer extension" approach in the implementation of relevant aquaculture development projects in the region.

For more information please download the prospectus. If you wish to participate please email info@enaca.org:

<http://www.enaca.org/uploads/announcements/international-symposium-freshwater-aquaculture-extension.pdf>

'Perfect' food for 'perfect' prawns

Australian researchers have developed a food additive for farmed prawns that will mean prawn lovers will have access to more sustainable prawns that still taste great.

After 10 years of research, CSIRO scientists have perfected the Novacq™ prawn feed additive. Farmed prawns fed with Novacq grow on average 30 per cent faster, are healthier and can be produced with no fish products in their diet, a world-first achievement in sustainability.

CSIRO's Dr Nigel Preston has been working with the A\$75 million Australian prawn farming industry for over 25 years, and says this is a game changer for the industry.

"We fed Novacq to black tiger prawns, and it made them even better for consumers, the environment and prawn farmers," Dr Preston said.

"This is a major achievement for the sustainability of Australia's aquaculture industry as prawns fed this diet are not only a top quality product and reach market size faster, they also no longer need to be fed with any products from wild fishery resources."

"This means that Australian prawn aquaculture, already a world leader in sustainability and environmental management, is now set to become even better, and really solidifies aquaculture as a sustainable source of protein to help meet the ever growing demand for food."

Until now, Australian prawn farmers have needed to feed their prawns with a pellet that includes some sustainably sourced fish meal or fish oil, in order to ensure that the prawns grew fast, and were a healthy and high quality product for consumers.

“When we are talking about relieving pressure on our ocean stocks of fish, every little bit helps. Novacq will mean that the Australian prawn farming industry could potentially no longer be reliant on wild-caught fishery products,” Dr Preston said.

CSIRO and Australian owned and based Ridley AgriProducts have announced that Ridley AgriProducts has taken a licence to produce and distribute Novacq in Australia and several South-East Asian countries. Mr Bob Harvey, General Manager AquaFeed from Ridley AgriProducts said this means the Australian industry will soon have the opportunity to use the Novacq feed additive to boost domestic prawn farm productivity.

“We’ve seen this product in action and we know how great it is. We’ve conducted multiple laboratory-based trials, and in conjunction with CSIRO and a great customer of ours, Australian Prawn Farms, we have proven the effects of Novacq when commercially grown, added into a commercial prawn feed and fed to black tiger prawns in multiple full-scale commercial sized ponds,” Mr Harvey said.

“Adding Novacq into even the best performing prawn diets on the market, we proved a significant incremental growth rate and food conversion rate improvement.

“We are really excited to now be able to start the process of commercialising Novacq, so that Australian prawn farmers will soon be able to benefit from it. Over the next twelve months we will be upscaling production, performing additional tests and further farm-scale trials, and then to move into full-scale commercial production.”

The effectiveness of Novacq has already been demonstrated on one Australian prawn farm, with Mr Matt West, Operations Manager of Australian Prawn Farms based at Ilbilbie in Northern Queensland, getting a chance to see the results over a period of four months testing the feed additive on black tiger prawns.

“What I saw on my farm was a clear incremental growth compared to the high quality diets that were used as a control for the large-scale trials we recently conducted at our farm,” Mr West said.

“Apart from the improved growth rate I observed, what is really exciting to me about Novacq is the very real possibility for Ridley to ultimately be able to produce a great performing prawn feed without using any marine sourced proteins in the diet. This will, of course, mean an even more sustainably produced prawn crop being farmed at Australian Prawn Farms.”

Novacq is an entirely natural food source based on the smallest organisms in the marine environment, the marine microbes which are the foundation of the marine food pyramid. It is based on over 10 years of CSIRO research to understand the natural marine microbial processes that occur in prawn farm ponds and natural marine estuaries, and the role of microbes in prawn nutrition.

Production of Novacq relies on the controlled production of these marine microbes. CSIRO researchers have discovered how to feed and harvest them, and convert them into a product that can then be added to feeds as a bioactive ingredient, like a dietary supplement for prawns.

Including Novacq in the diet of farmed prawns has shown for the first time that fish meal and fish oil can be completely replaced in the prawn diet, potentially freeing the prawn aquaculture industry from reliance on wild fishery resources. CSIRO has substantiated this through dozens of tests over the past five years, both in Australia and throughout Asia. These results will be presented today at the 2013 Ridley AquaFeed Australian Prawn and Barramundi Farmers Conference in Queensland.

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<http://www.csiro.au/en/Portals/Media/Perfect-food-for-perfect-prawns.aspx>

Aquaculture without Frontiers Special Session

Videos of the presentations given at the AwF Special Session at Aquaculture 2013 are available for online viewing at the link below. The presentations and speakers were:

- Aquaculture without Frontiers: Past, present and future
Dave Conley, AwF Director, Canada
- Aquaculture without Frontiers: Farmer to farmer programs
Kevin Fitzsimmons, University of Arizona
- Possibilities of AwF collaboration with Brazilian organizations working on poverty alleviation
Patricia Moraes-Valenti, Universidade de Santo Amaro
- Tilapia hatchery strategies in Asia - spanning the intensity continuum
David Little, University of Stirling
- Low resource tilapia culture in Haiti, limitations, opportunities and possible strategies for intensification
William N. Mebane, marine Biological Lab
- AwF’s role in developing Myanmar’s aquaculture potential
May Myat Noe Lwin, CNN Soft Shell Mud Crab Farms, Thailand
- Marketing AwF into the future
Roy Palmer, AwF Director, Australia

Available from: http://aquacomgroup.com/Page_sections/Multimedia/AwF_AA2013/AwF_AA2013_main.html

We asked CSIRO: Gold Coast Tiger Prawns

Nick Moore, Gold Coast Marine Aquaculture

It was back in the '90s we realised that to be successful we needed to domesticate the black tiger prawn, in other words, breed them in captivity. Now we knew most of that, but we couldn't do it all on our own.

So we asked CSIRO to give us a hand and basically what they've come and helped us with is the health screening of them, and now, as we've got to the end of the whole road, the genetics.

We can now truly breed them in captivity very successfully and very commercially. Every year our prawns are improving.

We've got a prawn that we consider to be as good as anyone in the world and that's been attested to recently when we've won the gold medals at the recent Royal Easter Show and have now been nominated for the Presidents Medal, which is the top six of all of the champions.

The results that we're getting now from our domesticated stock is probably three times more than we'll get from any East Coast of the wild.

But it's more than that, not only do they grow faster and eat less food, and obviously create a far better economic return for us, it's a matter of getting your animals into the ponds when you require them and that's priceless.

The relationship with CSIRO has been very beneficial to the whole industry, we've got a situation now where we can guarantee to stock our ponds on the week, almost to the day that we require and that's something you can't do when you go to the wild. I think, going back, some years ago, we realised you'd need as many as 12 ducks to line up in a row and CSIRO's given us the last two ducks.

They're great to work with, they're professional, but I think what stands them out, more than anything else, is they have true desire and a wish to succeed, the same as we do and when we succeed they get just a bigger kick as we do.

Video transcript reproduced with permission of CSIRO. You can see Nick's presentation on CSIRO's website at:

http://www.csiro.au/news/transcripts/YouTubeTranscripts/2013/Sep/We_asked_CSIRO_Prawns.htm

Understanding the sex of salmon

Producing only female salmon is critical to the success of the AUD\$408 million Atlantic salmon aquaculture industry in Australia. Our researchers are developing a genetic test to distinguish the sex of young salmon.

Australia's salmon industry relies on female salmon being grown for consumption because during the last year of growth in the sea males reduce muscle production, lose condition and are more vulnerable to disease, which can result in significant productivity losses for farmers.

There is an industry-wide need for a fast, cheap and reliable method to correctly identify the sex of salmon breeding stock in order to achieve this all-female production with greater efficiency and certainty.

CSIRO researchers, together with colleagues from the Simon Fraser University in Vancouver, Canada, have been using genetic markers known as microsatellites and gene sequencing technology to understand more about how sex determination works in salmon.

The researchers needed to develop a better test for salmon sex because distinguishing between the sexes is difficult, particularly at a young age.

A DNA-based genetic test is needed to distinguish them because salmon don't have visually distinguishable sex chromosomes like the human XY chromosomes. Instead they have a genetic region containing the genes that determine sex.

The researchers discovered the sex-determination region was located on three different chromosomes in different families of the Tasmanian Atlantic salmon population they examined. With this information the researchers developed a way of determining the sex of a fish from a particular family. The researchers are currently developing the test further for commercial use.

These findings have implications for how Atlantic salmon breeding programs will be managed in the future. The research is an important part of the Sex Ratio and Sterility

Cluster research program, which aims to understand and manage sex and sterility in farmed animals to improve productivity, profitability and animal welfare.

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Overcoming smallholder challenges with biotechnology

From breeding to bugs, a new FAO publication looks at biotechnologies at work in small-scale crop, livestock and fish production

The publication, *Biotechnologies at Work for Smallholders: Case Studies from Developing Countries in Crops, Livestock and Fish*, asserts biotechnologies can help smallholders to improve their livelihoods and food security.

Biotechnologies at Work for Smallholders covers 19 case studies in crops, livestock and fisheries, written by scientists and researchers worldwide. It describes the practical realities and experiences of taking biotechnology research and applying it in smallholder production of bananas, cassava, rice, livestock, shrimp and more, in different parts of the developing world.

The case studies encompassed a wide range of biotechnologies. They included older or “traditional” ones like artificial insemination and fermentation, and cutting-edge techniques involving DNA-based methodologies - but not genetic modification.

The publication was prepared by a multi-disciplinary team at FAO as part of an agricultural biotechnologies project partially funded by the Government of Canada.

“With the right institutional and financial arrangements, governments, research institutions and organizations can help to bring biotechnologies to smallholders, improving their capacity to cope with challenges like climate change, plant and animal diseases, and the overuse of natural resources,” said Andrea Sonnino, Chief of FAO’s Research and Extension Unit.

Case studies

Four case studies were from India, two from China and one each from Argentina, Bangladesh, Brazil, Cameroon, Colombia, Cuba, Ghana, Nigeria, South Africa, Sri Lanka, Tanzania and Thailand.

Researchers used their knowledge of DNA markers to develop a flood-tolerant rice variety in India with a potential yield of 1-3 tons per hectare more than previously used varieties, under flood conditions. After being released in 2009, the new variety, Swarna-Sub1, spread rapidly and was used by three million farmers in 2012.

“In summary, submergence-tolerant varieties provided opportunities for improving and stabilizing yields in flash flood-affected areas, significantly contributing to national food security,” stated Uma Singh and colleagues from the International Rice Research Institute (IRRI) who prepared the case study.

In China, the Jian carp was developed using within-family genetic selection and gynogenesis (a reproductive technology resulting in all-female offspring that have only received genes from their mother). The Jian carp is now grown on about 160,000 fish farms and makes up over 50 percent of common carp production in China.

In northern Cameroon, the use of DNA-based diagnostic tools in the field allowed veterinary authorities to quickly diagnose outbreaks of Peste des Petits Ruminants, a highly contagious viral disease affecting goats and sheep. Rapid and accurate disease diagnosis meant that the authorities could stamp out these outbreaks and stop the spread of the fatal disease to other flocks.

“Without this rapid response, thousands of sheep and goats would likely have succumbed to the disease during these outbreaks, leading to millions of CFA francs in losses,” affirmed Abel Wade and Abdoukadiiri Souley from the National Veterinary Laboratory (LANAVET) in Cameroon.

The editors say biotechnologies can improve crop-, livestock- and fish-related livelihoods by boosting yields and enhancing market access. Introducing new and traditional biotechnologies on family farms can also keep production costs down and improve sustainable management of natural resources.

Lessons learned

The publication offers lessons from the case studies which can be used to inform and assist policymakers in making decisions on programs involving biotechnologies. High up on the list was the need for national political commitment to improving smallholder productivity and livelihoods; financial support from non-governmental sources to supplement national efforts; and, long-term national investment in both people and infrastructure linked to science and technology.

The publication also found international and national partnerships were vital for achieving results, as was the sharing of genetic resources, techniques and know-how across national and continental borders.

Biotechnologies at work for smallholders also underlines the importance of involving smallholders in the process at all stages, taking into consideration their knowledge, skills and own initiatives.

Source: FAO. Download this free book from the FAO website at:

<http://www.fao.org/docrep/018/i3403e/i3403e00.htm>

Coordinated efforts in aquaculture needed to meet global demand

Global partnership to find sustainable solutions 'imperative', FAO says

The creation of a global partnership to help ensure that the world's fish supplies can keep pace with booming demand has received a green light from FAO's Sub-Committee on Aquaculture.

Over 50 countries endorsed the Global Aquaculture Advancement Partnership (GAAP) programme, which will bring together governments, UN agencies, non-governmental organizations and the private sector to find sustainable solutions to meeting the need for fish products.

Aquaculture already supplies nearly 50 percent – or nearly 63 million tonnes – of fish consumed globally, and with production from wild fish stocks levelling off, it will fall to fish farmers to supply the estimated 50 million additional tonnes required to feed the rising world population by 2030.

But while aquaculture is one of the fastest expanding food sectors in the world with a current growth rate of around 6.1 percent a year, recent trends predict a gradual decline which might see the sector fall short of bridging the gap between projected supply and demand.

"This is an alarming situation and urgent concerted efforts to build a strong private-public partnership are imperative to maintain the current rate of growth of aquaculture over the coming years," said Árni M. Mathiesen, FAO Assistant Director-General for Fisheries and Aquaculture.

The partnership will be tasked with overcoming obstacles to the expansion of the sector, which include the increasing scarcity of land and water for the development of inland fisheries and the need to step up aquaculture activities in the world's seas and oceans.

This in turn will require strict governance to safeguard aquatic animal health and conserve biodiversity.

"GAAP will also help tap the huge potential of aquaculture to help reduce poverty, unemployment and socio-economic inequalities through proper

planning and development," Mathiesen said, recalling that around 80 percent of fish farmers are small-scale.

Some 55 million people are directly employed by the fisheries and aquaculture sector, of whom 85 percent live in Asia.

The initiative will now go for approval to the Committee on Fisheries when it meets at FAO headquarters in Rome in June 2014.

Certification benchmarking

A tool to help countries assess whether public and private aquaculture certification schemes are in line with FAO's global guidelines for certification has also received a nod from the sub-committee, which is the only global intergovernmental forum discussing aquaculture development.

Covering animal health, food safety, the environment and worker welfare issues, the FAO aquaculture guidelines were approved in 2011 after four years of consultation among governments, producers, processors and traders.

"It is overwhelmingly positive that consumers want to see a label on a product showing that it is sustainably produced. The challenge is to ensure certification provides adequate incentives to small producers and eventually contributes to overall sustainability of the sector," said FAO Senior Aquaculture Officer Rohana Subasinghe.

"Many schemes claim they are within the FAO guidelines, but this new evaluation framework will allow them to self-assess whether that's true," he said.

The evaluation framework will also now pass to the Committee on Fisheries for approval in June next year.

Source: FAO.



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